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JOURNAL OF BOTANY

AND

KEW GARDEN MISCELLANY.

EDITED BY

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Remarks on the Flora of the Nicobar Islands. Translated from COMMODORE STEEN BILLE'S 'BERETNING OM CORVETTEN GALATHEA'S REISE OMKRING JORDEN,' 1845, 46, 47. (*Narrative of the Voyage round the World of the Corvette Galathea.*) *Vol. I. Copenhagen*, 1849. 8*vo*. *Translated from the Danish by* N. WALLICH, M. et Ph. D., F.R.S., V.P.L.S.*

It has been usual to include the Nicobar Islands under the Scitamineous Kingdom of Schouw (the Indian, or Roxburgh's), comprising the two grand Indian peninsulas, Ceylon, the Maldives, the Laccadives, and the Andamans. But since scarcely more than the following plants of these islands were known at the time, namely, *Boerhavia glutinosa*, Vahl; *Scirpus subulatus*, Vahl; *Cyperus cephalotes*, Vahl; *Pandanus Mellori*, Roxb., or Nicobar bread-fruit (Alex. Moon's 'View of the Plants of Ceylon'); *Davallia heterophylla*, Willd., and *Lindsæa tenera*, Dryand. (Trans. Linn. Soc., vol. iii. p. 42); it must have been the position of the islands between two continents which determined the point. The annexed list of the genera which occur on the Nicobars will demonstrate that this view has been very fortunate; a large proportion being likewise found on the peninsula of India, as well as in Ceylon. But it will be remarked, also, that the vegetation is, as it were, a radiation from that in question, connecting it with the Flora (the Polynesian Kingdom of Schouw, or Reinwardt's) of the grand groupe of islands extending from Sumatra eastwards. This is pointed out by the genera *Dissochæta*, *Orophea*, *Pterisanthes*, *Arthrophyllum*, and *Visenia*, characteristic of that kingdom.

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* I have made this translation from a corrected copy of the Narrative, communicated to me by its distinguished author, who informs me that Mr. Didrichsen, Assistant-Surgeon on board the corvette, has drawn up this botanical part. It was not to be expected that a sojourn of only two months, during the hot and dry season of the year, would afford very extensive materials for a Nicobar Flora; nevertheless, zeal and industry have done all that was possible, and we have to thank them for much valuable and interesting information contained in the following pages.—N. W.

If the above view is correct, a tolerable idea of the Nicobar vegetation may be formed from what is known of the Indian Flora (the continent and islands, as far as the Philippines, with a mean temperature of 15°–25° Réaum.). It must be noticed, however, that there exists a geognostic difference between the southern islands (Sambelong, Little Nicobar, and Catschall*) and the northern, and that hence a considerable difference is observable in the distribution and character of their plants. The first-named islands seem to be composed of calcareous sandstone and clay-slate. Both of these are easily affected by the condition of the atmosphere: the chalk is neutralized by the carbonic acid combined with the rain; and provided the rocky substratum be not very inclined, the soil is several feet deep and apparently very fertile, consisting of lime, with sand and micaceous clay. We accordingly find these islands, although the highest of the whole cluster, forest-clad to the very top. Quite different is the appearance on the northern islands, where plutonian, especially serpentine, rocks predominate. Decomposition of these may in time produce a good soil; but the process goes on with far more difficulty than in the southern islands, consequently the soil here is much less abundant. Besides, it is only on Bompoka, Tillangschong, and Terressa, that the surface is naked; on Nancovry, Trincut, Car-Nicobar, and partly also in Terressa, the surface is hidden by a crust of strongly absorbent, meerschaum-like clay, containing iron, talc, and sometimes chalk, but destitute of alkalies, covered partially by a stratum of soil only a few inches deep and unsuited for any sort of cultivation. The undulated surface of these islands, contrary to what is seen on the sharp ridges of the southern groupe, is covered with grass only, without forest, having species of *Pandanus* and *Areca*, in small clusters or solitary, scattered over it. It is only in valleys, where a somewhat richer soil has accumulated, that large masses of trees are seen. In comparing the vegetable features of these islands with those of the surrounding countries, I will for the present confine myself to those of the southernmost.

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* I have invariably adhered to Mr. Didrichsen's orthography of localities.—N. W.

The profusion of vegetation which covers these islands is probably nowhere surpassed in India. Nearly the whole area of the islands is covered with dense primeval forests: scarcely one open spot is to be met with, where direct solar light admits of an herbaceous growth. But this overwhelming denseness is not owing to the predominance of a few social plants, as is the case in temperate zones, but results from a large number of species crowded together in great variety. This becomes at once obvious when it is stated that, out of seventy-three dicotyledoneous genera, eleven-nineteenths appear as trees or shrubs, occasionally (*Ficus*) in numerous species. But this luxuriance confines itself not alone to the extent of the forests; it is manifest also in the grand and colossal size of the individual trees and shrubs composing them, and this applies likewise to the tropical richness of certain herbaceous plants (*Musa sapientum, Troglodytarum* ?), and to grasses (*Bambusa*).

The "Galathea's" stay at the Nicobars was during the height of the dry season (January and February), and yet I do not recollect having observed one single sound tree in a naked condition; the forests being fully as verdant with foliage as with us in the month of June. This, however, is not dependent so much on a predominance of evergreen trees, which are of frequent occurrence (*Aurantiaceæ, Clusiaceæ, Rhizophoreæ, Myrtaceæ*), as on their continued or, on the whole, little interrupted process of vegetation. As an instance of this I may mention that *Thespesia populnea, Paritium tiliaceum, Sterculia Balanghas*, and *Sophora tomentosa*,—trees with herbaceous, soft leaves,—were not only in full foliage, but in flower and fruit.

The trees in these ancient forests grow so closely together, that they are compelled to shoot up in length, being most frequently without branches to a great height from the root, and the crowns so full of leaves and so much crowded together, that they produce great darkness underneath. The leaves are frequently very large in size, such as many *Laurineæ, Mappa, Artocarpus, Uvaria, Barringtonia.* Trees with compound leaves are very frequent (*Mimoseæ, Papilionaceæ, Aurantiaceæ, Sapindaceæ, Canarium, Cnestis*); sometimes they are very large (*Sapindus, Palmæ*). As examples of herbaceous plants with very large leaves may be mentioned *Musa, Colocasia, Caladium, Asplenium Nidus, Leea.*

We are reminded of the high development and luxuriance of the vegetation of tropical India by such fruits as the *Shaddock* (*Citrus decumana*), the *Papaya* (*Carica Papaya*), the *Atap* (*Nipa fruticans*), the Jack (*Artocarpus integrifolia*), the bread-fruit (*Artocarpus incisa*), the fruit of *Entada Pursætha, Barringtonia speciosa,* and *Pandanus.*

In the dense forest-shade alluded to, phænogamous plants were rarely seen, the ground being, for the most part, occupied by impenetrable masses of vegetable matter in a state of decomposition; and it was only by glimpses that the crowds of climbing, twining, and parasitical plants, occupying the tops of the trees, could be discerned. On the smaller islands, *e.g.* Pulo Milu, and along the sea-shores of those of greater size, as well as generally wherever the forests were less dense and dark, an underwood appeared, which consisted most frequently of species of *Guilandina, Psidium, Bridelia, Gelonium, Feronia, Orophea, Nauclea, Marinda, Jasminum, Elæagnus, Boehmeria, Epicarpurus, Ficus* (*racemosa*). These were again intermixed with an endless pell-mell of twiners and climbers, the former chiefly consisting of graceful Ferns (*Lygodium*), *Menispermeæ,* numerous *Convolvulaceæ, Ampelideæ, Cucurbitaceæ,* species of *Aristolochia, Roxburghia, Smilax,* and *Piper.* The large trees were strung with mighty twiners, such as *Mucuna, Canavalia, Pongamia, Conocephalus,* and the gigantic *Entada Pursætha*; while their trunks supported half-parasitical *Ficus*-species, *Hoya viridiflora, Pothos scandens,* elegant *Lycopodia,* and many ferns (*Anthrophyum, Vittaria, Asplenium*), the luxuriant *Asplenium Nidus* being the most conspicuous among them. Of *Orchideæ* there were only few in number as well as in species (*Dendrobium*?): they were somewhat withered, and were the only plants which pointed at the aridity of the season.

The underwood is so dense as, on that account alone, to be very difficult to be traversed; but it becomes entirely impenetrable on occasions, which not unfrequently occur when it is overgrown with species of rattan (*Calamus*). Their leaves, from ten to twelve feet long, are densely armed below with thorns of several inches, while their elongated midrib, eight to twelve feet long, is densely beset with recurved hooks. Here none but the natives are able to penetrate by the aid of the cutlass, which they wield with great dexterity and celerity. I may likewise add, that nowhere have I seen such vast primeval forests, with such dense and impenetrable underwood, as I found here on the southern Nicobars. At the neighbouring Pulo Penang, for instance, neither are the still remaining forests so grand, nor the underwood so crowded, as to prevent their being traversed with small difficulty.

As I have said already, the dense part of the forests, in which underwood is mostly wanting, is peculiar to the southern islands; while the more open portion, which is furnished with underwood, is much narrower on the northern islands, with the exception perhaps of Car-Nicobar,—its outer margin imperceptibly dwindling into the vegetation of the more recent alluvium. It is frequently extended, towards the interior, into low valleys, without being met there with any dense forests. On the contrary, the forest becomes more open and low, and is gradually succeeded by a number of elegant shrubs, chiefly of the genera *Ixora*, *Inga*, *Cassia*, *Colubrina*, *Flemingia*, *Bauhinia*, *Vitex*, *Mæsa*, *Erycibe*, *Leea*, *Rubus* (*moluccanus*), *Mussænda* (*frondosa*), and *Melastoma* (*Malabathricum*), mixed with shrubby or arborescent ferns. Heath-like tracts covered with a sort of fern (*Gleichenia*), or luxuriant grass-plains, occasionally take the place of those shrubs. Within the belt thus formed, the hills are on the whole covered with grass only. The sod towards the inner confines of the forest, at places where the soil is richer and more moist, is formed of soft, juicy grasses, and in part of stiff and arid sorts of *Cyperaceæ* (*Scleria*, *Cyperus*, *Diplacrum*); but the greater area is occupied by more delicate, yet dry and stiff, grasses, among which a species of *Imperata* (*Lalang*) performs an important part. This is almost the only plant on the Nicobars which, being in the highest degree social, occupies whole tracts of land, excluding all other lower vegetation, and admitting only here and there, on the borders, the growth of other sorts of grasses, and of some species of *Alysicarpus*, *Desmodium*, *Uraria*, *Smithia*, and *Crotalaria*, which may be compared in some degree with our clovers. Towards the top of the hills even the grasses become scanty and stinted, ceasing at length altogether on spots where the clay is covered by a coarse sand, containing some iron, and washed into barrenness by the frequent falls of rain, and producing only few and poor plants of species of *Leucas*, *Aerva*, and *Evolvulus*. Although all these grass-plains possessed some degree of freshness, yet they exhibited such a uniformly arid, barren, steppe-resembling picture, as to have nothing like it in our country. With us, the meadows, apart from the difference in the soil, produce such variety of species, and in such profusion and luxuriance of growth, that by way of distinction, the grass-lands of the northern Nicobar Islands might without impropriety be designated as grass-heaths. Even the soft and undulating outline of the hills contributed to this fatiguing uniformity of scenery, very sparingly relieved by the scanty and small clumps of *Areca* and *Pandanus* species. In this last respect the island of Bompoka differs. It has a rounded form and bold volcanic elevation; it terminates abruptly, with an extensive crater-like depression, overgrown by a dense forest, in which Areca-palms rise above the other trees, while the sides are strikingly varied by a number of radiating ridges and valleys, resembling in this respect the island of Madeira on a small scale, and exclusively covered with the before-mentioned grass-carpet.

The heights, as well as the skirting flats, which form the greatest part of the area of these islands, participate in the sort of vegetation alluded to; but the more recently formed low-lands, though of less extent, are of far greater importance to the natives; and however different in regard to their origin and structure, the social character of many of their trees and shrubs is very striking, when contrasted with the varied constituents of the old forests.

Along the coast extends a narrow slip of land, consisting of fragments of corals, mixed up with *débris* of old rocks, becoming more predominant as the tract recedes from the sea. Here and there it is interrupted by precipitous rocks, or the accumulation of fresh water. On the whole, the slip is narrower and of less extent on the southern islands; and, since it constitutes the principal portion of the cultivable land, the consequence of this disparity is, that the population of the northern islands is far greater than that of the others.

The sea-beach is elevated some feet by the force of the wind and waves, and consists of dazzling white coral-sand; and, beyond the reach of the high tides, it shelters a narrow band of low, creeping plants, a kind of *Ischæmum*, *Dolichos luteus*, and *Convolvulus maritimus* (so common on all tropical sea-shores). Beyond this band, wherever nature has not been disturbed, is seen a dense vegetation formed by two shrubby plants only, namely *Tournefortia* (*argentea* ?) and *Scævola Taccada*, to the exclusion of all others, and, indeed, of each other reciprocally. Thus, the former occurs in great abundance on the island of Trice, the latter not at all; while the reverse is the case on the adjacent Pulo Milu. Both these plants grow so close together, and with such fresh luxuriance, that they look like some neatly-trimmed hedge. The silvery *Tournefortia* attains a height of twenty feet, and is distinguishable even at a distance by its greyish tint; while the dense-leaved and pale-green *Scævola* luxuriates in all the vigour of a vernal freshness; but it is often, together with the *Ischæmum* beyond, overgrown by large masses of a pale-yellow, leafless, filiform, social parasite, the *Cassytha filiformis*.

Within or beyond this fence, rarely on the sea-side of it, we have a variety of trees, which are either not found at all elsewhere, or appear here in greatest number, although they belong not to the social class. Among the commonest is the magnificent *Barringtonia speciosa*, *Guettarda speciosa*, which perfumes the air after the sun has set, *Calophyllum Inophyllum*, *Paritium tiliaceum*, *Thespesia populnea*, *Heritiera litoralis*? *Hernandia ovigera*? and *Sterculia Balanghas*. Of smaller size, but not less striking by their frequency, are species of *Sophora* (*tomentosa*), *Canavalia*, *Bridelia*, *Glochidion*, *Mappa*, and *Ricinus communis*. This last, on Catschall, was of the size of a tree twelve to thirteen feet high, with seeds much smaller than what is usual when it is herbaceous; and it formed a thick grove, occupying several acres, probably the result of cultivation. But it is the Cocoa-nut, almost the only plant cultivated with any sort of care by the inhabitants, which occupies the largest space of the coral-land, and at once attracts the eye of the new-comer, both by its numbers and form, all the other vegetation, however striking, forming as it were only the frame-work to this palm. I am not aware of the Cocoa occurring anywhere beyond the coral-land, with the exception of the little elevation of about 100 feet of the small rocky island of Montchal, and the upper part of the river of Little Nicobar. It is planted without any regularity, and more closely than in many other parts of India; neither is it kept free from weeds or sometimes even a dense coppice, nor are the older trees surrounded by a circular ridge for the purpose of irrigation in the dry season; and yet I know not that I have seen it anywhere in greater luxuriance, or producing a greater quantity of fruit, than on the Nicobars.

There is a fresh-water pool nearly in the middle of Milu, leaning on sandstone and clay-slate formations to the westward, but in other directions surrounded by coral-land. Its fine, dark, peat-like soil was still, towards the end of the dry season, very moist, and so unresisting that you everywhere sank down. There was none of the lower vegetation here, but so much the greater abundance of *Pandanus* and *Areca*; especially the former, which, although growing frequently and luxuriantly everywhere, and constituting one of the most striking features of the Nicobar Flora, seems at this place to attain its greatest development, both as to numbers and dimensions. It was from thirty to forty feet high, and more, dividing four to six times into branches, and bearing fruits of eighteen to twenty inches in length. On another island, Trice, there was a somewhat similar pool of fresh water, differing in this, that it had no vent towards the sea-side, so that it must be like a small lake during the rainy season. In February it was almost dry; the soil contained much less humus, and supported a low vegetation (*Helminthostachys dulcis*) with few *Pandani* only, while there was a surrounding high, open forest of various species of *Ficus*, and of *Barringtonia racemosa*, with an underwood of *Feronia elephantum* and an *Ardisia*. I know of no other pools on the islands, like the above; but on the Galathea river, on the river which falls into the bay of Pulo Milu, and probably often on the large islands, extensive breaks in the coral-land are caused by the so-called Mangrove swamps. The inner part of the bay just mentioned, where the river empties itself, is covered with slime, on which, during the ebb-tide, there are only a few feet of water, and where a stray little Mangrove is only rarely observable; but where the sea recedes entirely during its ebb, the Mangrove thicket commences, covering perhaps the outer two-thirds of the valley through which the river flows. This whole extent is covered with brackish water during the flood-tide; and during the ebb the mud contains rich quantities of crustacea and mollusca. With exception of the Mangrove (*Bruguiera gymnorrhiza*) and a less frequent acanthaceous plant (*Dilivaria*) there is no other vegetation. Close to the margin of the bay, the first forms a very dense shrubbery, not unlike an Alder coppice; but it soon becomes a high and open forest, made difficult of access by the deep mud, and the knee-formed roots projecting above it. Where the influence of the tides ceases, the Mangrove disappears with it; and so far as the river inundation extends during the rains a varied vegetation flourishes, consisting of *Ficus*, *Pandanus*, *Flagellaria*, *Calamus*, *Inga*, *Cordyline*, the wild Plantain, arborescent Ferns, *Convolvulaceæ*, and receiving a remarkable feature from the very frequent Atap (*Nipa fruticans*), a stemless, palm-like plant, having its large fruit often ripening under the water. As soon as the river side rises several feet above the water, the Atap disappears altogether, and the vegetation becomes very beautiful; the rich, still open forests contain *Pandani* and Areca-palms, and are succeeded occasionally by open tracts of luxuriant shrubby or arboreous ferns, *Melastomeæ*, high grass, *Rubus*, *Carica Papaya*, or occupied by the little, partly enclosed gardens of the natives, in which the Sugar-cane, the Cocoa-nut, Oranges, Bananas, Yams (*Calocasia indica* and *Caladium nymphæifolium*) thrive to a degree of perfection, which points at this tract as the most fertile on the island, and as that which, in case of colonization, would be the principal land to cultivate, the coral-land being almost entirely occupied already.

Finally, the coral-land is interrupted occasionally by rocks projecting into the reef, which is inundated during flood-tide. Here the elevated sea-beach does not exist; and the almost bare rocks are characterized by a very common *Casuarina*, and also a *Callicarpa* and a *Sponia* (*Celtis vestimentaria*, Kamphövener).

It will be noticed, in the accompanying list of genera of plants found on the Nicobars, that a number of forms are wanting which, considering the geographical position of the islands, might have been expected in it; for instance:—*Ceratopteris*, *Marsilea*, *Stratiotes*, *Nepenthes*, and *Quercus*, all of which occur on the neighbouring Pulo Penang, to the extent of nine species of the Oak alone. This deficiency may be owing, in part, to there being no open stagnant water on any of the groupe (excepting, perhaps, Trice); and partly also to our brief examination having taken place during the dry season, and not reaching at all to the extensive, wooded heights of the islands.

Enumeration of 261 Genera found on the Nicobars, distributed into ninety-nine Natural Orders:—

Mimoseæ: *Inga*, *Acacia*, *Entada*, *Mimosa*.—Leguminosæ: *Bauhinia*, *Cassia*, *Tamarindus*, *Guilandina*, *Sophora*, *Dalbergia*, *Pangamia*, *Abrus*, *Flemingia*, *Numismia*, *Cajanus*, *Dolichos*, *Mucuna*, *Canavalia*, *Clitoria*, *Alysicarpus*, *Dicerma*, *Desmodium*, *Uraria*, *Smithia*, *Crotalaria*.—Rosaceæ: *Rubus*.—Myrtaceæ: *Barringtonia*, *Eugenia*, *Psidium*.—Melastomeæ: *Dissochæte*, *Osbeckia*, *Melastoma*.—Œnothereæ: *Jussieua*.—

Rhizophoreæ: *Bruguiera, Rhizophora, Carallia.*—Combretaceæ: *Combretum.* — Ochnaceæ: *Ochna.*— Connaraceæ: *Cnestis.*—Burseraceæ: *Canarium.*—Anacardiaceæ: *Semecarpus, Rhus, Mangifera, Sorindeia.*—Euphorbiaceæ: *Glochidion, Cicca, Phyllanthus, Bridelia, Gelonium, Ricinus, Mappa, Claoxylon, Manihot, Acalypha, Euphorbia.*—Rhamneæ: *Colubrina, Gouania.*—Hippocrateæ: *Salacia.*—Celastrinæ: *Euonymus.*—Pittosporeæ: *Pittosporum.* — Polygaleæ: *Polygala.*—Sapindaceæ: *Schmiedelia, Sapindus.*—Aurantiaceæ: *Triphasia, Atalantia? Citrus, Glycosmis, Feronia.* — Clusiaceæ: *Garcinia, Calophyllum.* — Dipterocarpeæ: *Terminalia.* — Chlenaceæ: *Hugonia?* — Tiliaceæ: *Grewia, Elæocarpus, Monocera.*—Byttneriaceæ: *Visenia.*—Sterculiaceæ: *Sterculia, Heritiera, Helicteres.*—Malvaceæ: *Paritium, Thespesia, Urena, Sida, Hibiscus, Abelmoschus.* —Cucurbitaceæ: *Lagenaria, Momordica.* — Papayaceæ: *Carica.*— Bixaceæ: *Bixa.**— Nymphæaceæ: *Nymphæa.*—Capparideæ: *Gynandropsis, Polanisia.*—Anonaceæ: *Anona, Uvaria, Orophea.*—Myristiceæ: *Myristica.* —Menispermeæ: *Menispermum, Cocculus, Stephania.*—Lorantheæ: *Loranthus?.*—Ampelideæ: *Leea, Cissus, Pterisanthes.*—Araliaceæ: *Aralia, Arthrophyllum.*—Umbelliferæ: *Hydrocotyle.*—Sapoteæ: *Sideroxylon.*—Myrsineæ: *Ardisia, Mæsa.*—Ebenaceæ: *Diospyros.*—Bignoniaceæ: *Spathodea.*—Acanthaceæ: *Thunbergia, Dilivaria, Justicia.*—Scrophularineæ: *Bonnaya.*—Solanaceæ: *Capsicum, Datura, Nicotiana, Solanum.* — Hydroleaceæ: *Hydrolea.*—Convolvulaceæ: *Convolvulus, Ipomœa, Erycibe, Lepistemon, Aniseia, Calonyction, Evolvulus.*—Asperifoliæ: *Ehretia, Tournefortia.*—Cordiaceæ: *Cordia.*—Verbenaceæ: *Vitex, Premna, Clerodendron, Callicarpa.*—Labiatæ: *Ocymum, Stachys? Orthosiphon, Leucas.* — Asclepiadeæ: *Hoya, Sarcolobus.*—Apocyneæ: *Alstonia, Cerbera, Tabernæmontana.*—Loganiaceæ: *Fagræa.*—Oleinæ: *Chionanthus.*—Jasmineæ: *Jasminum.*—Rubiaceæ: *Mussænda, Ixora, Nauclea, Serissa, Psychotria, Guettarda, Ophiorrhiza, Morinda, Hedyotis, Gonotheca.*—Lobeliaceæ: *Lobelia.*—Goodeniaceæ: *Scævola.*—Compositæ: *Ageratum, Cyanopsis, Vernonia? Wedelia, Eclipta, Adenostemma, Bidens, Spilanthes, Conyza?* —Aristolochieæ: *Aristolochia.* — Elæagneæ: *Elæagnus.*—Hernandiaceæ: *Hernandia.*—Laurineæ: *Polyadenia? Litsæa? Cassytha.*—Polygoneæ: *Polygonum.*—Amarantaceæ: *Aerva, Alternanthera, Achyranthes, Desmochæta.*—Antidesmeæ: *Antidesma, Lepidostachys?.*—Urticeæ: *Elatostemma, Boehmeria, Parietaria, Urtica.*—Artocarpeæ: *Ficus,*

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* Scarcely indigenous. *N. W.*

Artocarpus, *Conocephalus*.—Moreæ: *Epicarpurus*.—Casuarineæ: *Casuarina*.—Piperaceæ: *Piper*.—Palmæ: *Cocos*, *Areca*, *Calamus*.—Pandaneæ: *Pandanus*, *Nipa*.—Aroideæ: *Caladium*, *Colocasia*, *Pothos*.—Najadeæ: *Zostera*.—Musaceæ: *Musa*.—Cannaceæ: *Canna*.—Zingiberaceæ: *Alpinia (phœnicea, Kamphövener)*, *Amomum fructu acido (Rink)*.—Orchideæ: *Dendrobium*.—Bromeliaceæ: *Ananassa*.*—Amaryllideæ: *Crinum*.—Hypoxideæ: *Curculigo*.—Dioscoreæ: *Dioscorea*.—Smilaceæ: *Roxburghia*, *Smilax*, *Cordyline*.—Junceæ: *Flagellaria*.—Commelyneæ: *Commelyna*, *Tradescantia*.—Eriocauleæ: *Eriocaulon*.—Cyperaceæ: *Cyperus*, *Kyllingia*, *Scirpus*, *Fimbristylis*, *Haplostylis*, *Diplacrum*, *Scleria*.—Gramineæ: *Oplismenus*, *Panicum*, *Ischæmum*, *Andropogon*, *Paspalus*, *Manisuris*, *Dimeria*, *Isachne*, *Imperata*, *Saccharum*, *Bambusa*, *Pennisetum*, *Dactyloctenium*, *Phragmites*, *Sporobolus*, *Eragrostis*, *Poa*.—Cycadeæ: *Cycas*.—Lycopodineæ: *Lycopodium*.—Ophioglosseæ: *Helminthostachys*.—Marattiaceæ: *Angiopteris*.—Schizæeæ: *Lygodium*.—Gleichenieæ: *Gleichenia*.—Hymenophylleæ: *Trichomanes*.—Polypodieæ: *Dicksonia*, *Davallia ?* *Lindsæa*, *Aspidium*, *Diplazium*, *Asplenium*, *Pteris*, *Vittaria*, *Adiantum ?* *Pleopeltis*, *Polypodium*, *Blechnum*, *Gymnogramma*, *Antrophyum*, *Acrostichum*.

Extracts from the private Letters of Dr. J. D. Hooker, *written during a Botanical Mission to* India.

(*Continued from* vol. i. p. 370.)

Darjeeling, Sikkim-Himalaya, and the Passes into Thibet.

Soon after my arrival at Darjeeling, I hired a couple of empty rooms in a long, cottage-like building, full of *dissepiments* (to speak botanically) which divide the suites, each of which consists of two small apartments. From having been a boarding-house and hotel consecutively, "the old hotel," as it is called, has lapsed into the condition of partly-furnished lodgings. At the invitation of Mr. Barnes (brother of my friends at Colgong), who occupied rooms contiguous to mine, I *chummed* with that gentleman, and most fortunate I was in finding so delightful a companion, whose society I also enjoyed in the excursions I made during the month of May.

The most lofty ridge of the mountain, on the northern spur of which

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* Assuredly not indigenous. *N. W.*

Darjeeling stands, is called SINCHUL: it is ascended from the saddle, crossed by a road from the plains, and lies to the right-hand in coming northward. Elevated at least 1,000 or 1,500 feet above Darjeeling, it is even more subalpine than Pacheem, but still does not rise into the regions of *Ranunculaceæ*, *Primroses*, or herbaceous *Saxifrages.* A heavy forest covers the whole summit, hoary with pendulous *Lichens* and *Mosses*; and its main feature consists in the groves of the large silvery-leaved white *Rhododendron*, and the purple-flowered *Magnolia.* A new species of *Balanophora* (*B. cyathoides*, MS.), with the leaves forming a cup-shaped involucre, or sheath, half-way up the flowering stem, grows at an elevation of 8–9,000 feet: it is monœcious, and flowers in May and June. *B. dioica*, Wall., grows above Darjeeling (alt. 7,500 feet) and flowers in July and August. Two other species, *B. typhina*, Wall., and *B. polyandra*, Griff., inhabit lower levels, and flower in September.

A narrow path winds to the double summit of Sinchul from the saddle, first passing through woods of the trees I described as characteristic of Pacheem, and then amongst a greater proportion of *Corneæ*, *Hydrangea*, and *Ilex*, mixed with the aforesaid *Rhododendron* and three species of *Magnolia.* *Ferns* are very luxuriant, *Hymenophylla* on the trees, *Marattia* and *Sphæropteris* and many *Aspidia* and *Davalliæ* on the ground. The commonest *Aspidium* is caulescent, like our *A. Filix-mas* in Wales, and so very abundant as to recall perpetually the latter plant, as it lines the avenues and lake-shores on the property of our friend Dillwyn Llewellyn, Esq., at Penllegare, South Wales. Several kinds of *Celastrus* are very frequent under-shrubs, but none in greater profusion than a new species of the Japan genus *Helwingia.* At this season its leaves are only unfolding, the upper ones bearing the flower on the midrib, exactly as in *Ruscus.* Its dark green foliage and bark, and the sub-herbaceous ramuli, besides some peculiarity of ramification, at once suggested its affinity with *Araliaceæ*; to a reduced form of which Order I have now no hesitation in referring it, after a careful examination of both its flower and lurid red fleshy drupe. It is a strong bush, six to eight feet high, branching from the base, of a heavy aspect, and its foliage turns dark in drying: it should be called after my friend Decaisne, the founder of the Order; and I never see it now without thinking of the happy hours we spent together at Paris.

The profusion of *Arums* in this region is quite remarkable; the most abundant on Sinchul is triphyllous, and it is like Wallich's *A. speciosum* (which is also frequent and much larger than is represented by Dr. W.'s figure*); the one to which I allude is, however, bulbous, and has a solitary trifoliolate leaf, and the hood, expanded laterally most extraordinarily, is turned sharply over, and terminated in a long sheathing tail, which envelopes the much longer one of the spadix, which, in the shape of a slender thread, trails eighteen inches on the ground. This, the *A. speciosum*, and all the species of a verticillate-leafleted groupe, are diœcious: they are noble plants, and I hope some of the many roots I have sent down will survive. The enormous clubs of scarlet berries which succeed these cuckoo-flowers are as striking in the woods in September as their blossoms are in April, when the cuckoo cries here as he does with us. *Paris* is another English spring genus now in flower, and very plentiful at this elevation (7–9,000 feet). Falconer tells me it is the *P. polyphylla*; it is really a grand thing, the stems three feet high, a whorl of seven to ten leaves, with three to five sepals, as many petals, three to eleven stamens, and two to six carpels. I counted the number of parts in some thirty specimens, for Professor Henslow, whose ingenious theory of the formation of the flower of *P. quadrifolia* will find confirmation in the irregularities of this. In autumn the fruit is ripe: it attains the size of an apple, bursting by several valves, and exhibiting a profusion of scarlet seeds very like those of a pomegranate. *Disporum* and *Convallaria* are both abundant, and the latter very beautiful, for it bears an immense raceme of white flowers, similar to those of *Muscari*, but as large as the *C. majalis*; this raceme is often a foot long. Another species is Wallich's *C. oppositifolia*. The leaves of an *Ophiopogon* were very abundant, as of various *Begonias*, *Didymocarpeæ*, but none in flower. Mr. Edgeworth's genus, *Streptolirion*, grows in amazing profusion a hundred yards above Darjeeling, to which station it hardly descends.

On the trunks of trees, at 8,000 feet, there are several epiphytal *Orchideæ*, and some which boast considerable beauty: I have three from that elevation, but am ignorant of their genera. Between 7,000 and 8,000 feet, there must be at least twenty species, including *Dendrobia*, three or four *Cœlogynes*, an *Eria* I think, and a *Cirrhopetalum*.

Three species of *Carex* occur on Sinchul; but no grass whatever could I detect: the mountain is also above the region of *Cucurbitaceæ*, which ascend to 7,500 feet, but not of *Smilax* and some other subtropical genera. *Ficus* and *Pepper* both reach the base of the ridge, 7,500 feet, but are not found higher. By the little streams, *Viola, Lobelia, Chrysosplenium*, and *Mimulus*, form verdant masses with chickweed. Five species of *Rubus* ascend to the summit: amongst them is a creeping white-flowered one, bearing large scarlet fruit. *Lardizabala* is common, and a small *Ampelopsis*, and a tufted *Vaccinium*. I did not observe a single *Labiate*, or *Leguminose*, and scarcely a *Composite* plant, except *Ainsliea*, one species of which flowers in spring, the other in autumn. *Urticeæ* are very numerous and succulent. Some small trees of *Styrax*? bear a profusion of white flowers, which lie like snow on the ground underneath: there are two species abont Darjeeling. But of all things that fall on the ground here, the most remarkable objects are the vivid red outer petals and sepals of the *Magnolia*. This magnificent tree is leafless during the flowering season (April), presenting only a few irregular branches from a trunk sixty to eighty feet in height, covered with a whitish bark. The flowers (resembling those of a *Lotus*) are terminal, oddly inserted, and, as well as their peduncles, brittle, and therefore easily damaged by the wind. There are two species, a larger and smaller-flowered, and I have the foliage of two others. At this height the common white-flowered *Michelia*, which I presume may be Wallich's *Magnolia excelsa*, is not so abundant as lower down, at 7,000 feet; where its frequency causes the trees, during its blossoming time, to look as if snowed upon. Like our hawthorn, &c., it does not bloom with equal profusion every year; but this season both it, the *Chestnut*, and the *Oak* are now unusually luxuriant.

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* Tentamen Fl. Nepal., Tab. xx.

The *Rhododendron* which abounds on this ridge is the *R. argenteum*.* It is inferior in size to the *Oaks*, *Magnolias*, *Ilex*, and *Pruni* and *Pyri* of the region, but individually it is far more abundant. Apparently the flowering has been very scanty this year. As is the case with most of the genus, it branches from the root: in this species the branches are as thick as the human body, or nearly so, covered with pale pinkish papery bark, twenty to forty feet long, inclined, compressed, sparingly divided towards the apex: the ramuli also, are few, and leafy only at the apices.†

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* Hooker's *Rhododendrons of Sikkim Himalaya*, tab. 9.

† The other Darjeeling species, which is conspicuous for its scarlet blossoms, is the *R. Campbelliæ* (vide *Rhododendrons of Sikkim Himalaya*, tab. 6.)

From the ridge of Sinchul a good view is obtainable, when the weather permits; but, often as I ascended it, for the first month I never saw beyond the very nearest tree-trunks. Though sharp and steep-sided, scarcely a piece of rock is anywhere visible; what there is, is a friable gneiss, like that of Darjeeling. The clay-banks are covered with *Mosses* and *Marchantiæ*, chiefly the former, and species of *Polytrichum.*

Fungi are immensely numerous in the moist woods, especially the *Hymenomycetes.* Of these the majority are dry on the cap (always except with the rain,—not viscid, I mean), inodorous, and edible. I am sure there are not fewer than 1,000 *Agarics* indigenous to this part of the Himalaya, and probably many more. All are very brittle and difficult to preserve, drying worse by far than the average of the English species. Where phytivorous insects are so numerous, their destruction is very rapid, even in the drying papers before they are six hours gathered,—having been *blown*, no doubt, by *Diptera*, before being pressed.

Dr. Campbell has given me a sketch of that beautiful *Phallus*, figured in Beechey's 'Voyage,'* which grew annually on some bamboo stumps near Cattmandu (in Nepal): he has also seen it here. Three or four smaller species of *Lycoperdon* are common; but the *Bovistinæ*, as a tribe, want more sunny pasture. *Agaricus campestris* rarely appears, and only in the artificially grassed paddocks near the residents' dwellings is it abundant. *Mucedineæ* are amazingly intrusive in the valley of Nepal and on the plains, as you might suppose from the dampness of the climate. I think I have a different species on each of the "moist colours" in my paint-box; there is one on my English boots, another on my country-made shoes; and except fire and hard metal it is difficult to name any substance free from them.† Hitherto I have met with only a single underground *Fungus*, this tribe probably preferring the drier and warmer woods to these excessively humid ones, as is the case, I think, in England; for, if I remember aright, Broome found the Scotch woods too damp, and the Welsh also. Some of the *Agarics* here assume anomalous forms, so beautiful and apparently normal, that it was with hesitation I first classed them with *monsters.* A common one, and the most beautiful in appearance, is that of an excessively branched erect bushy mass, six to ten inches high, and as much across, snowy white, firm, and inodorous; the innumerable branches covered with pendent, icicle-like bodies: I can find no fructification. Grotesque normal forms are rare, such, I mean, as we have at home in *Lycoperdon*, *Phallus*, and *Clathrus*, or *Aseroë* in Australia. Few species last a month; some few survive four; many are exceedingly local. I have not seen one of the hemispherical poisonous groupe, with viscid pileus: those having a plicate very delicate cap and remote gills are common.

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* *P. Demonum.*

† They have actually got between the lenses of the achromatic field-glass of my telescope.

As in most tropical and sub-tropical countries, the *Hymenomycetes* here are far the richest tribe in species and individuals, excepting possibly the *Coniomycetes* and *Hyphomycetes*, which, I presume, are neglected, of necessity, by even those travelling naturalists who can devote any time to the observation of *Fungi*. Besides *Agaricus*, including many of its sub-genera, we have *Lentinus*, a few *Boleti* and *Polypori*, *Hexagonium* and *Merulius*, *Hydnum*, *Thelephora* and *Auricularia*, *Clavaria*, *Tremella*, and *Exidia*;—*Gasteromycetes* are much rarer; I have not even met with the ubiquitous genus *Nidularia*. *Ascemycetes* are far from abundant: I have a few *Pezizæ*, *Helvellæ*, and *Sphæriæ*. Hitherto I have found no necrophytes, as *Caterpillar Fungi*, &c.

Billets of decayed wood, especially the logs cut for fire-wood, are often beautifully phosphorescent; the piles, some feet high, presenting a beautiful appearance in the forest by night, which is distinctly due to the presence of a Mycelium, whose area is circumscribed by a dark line. I have coaxed it much and long, by placing the logs in various places, to humour the Mycelium to perfect its fungus, but in vain. It penetrates deep into the decayed substance.

To conclude, I may mention that the size which some of the *Agarici* attain is very great, much greater than I have seen elsewhere. The pileus of one is fourteen inches in diameter, very fleshy, with a huge stipes: several species attain a diameter of eight and ten inches; whilst others have stout stipites as many inches high. One more word about *Fungi*. The moulds do not spare even the best new and still odorous Russia leather;—witness my writing-desk turning *blue*, though placed within two yards of a good fire (but shaded from its direct rays). Morocco leather, of course, is even more liable to be affected.

Excursion from Darjeeling to Tonglo, a Mountain on the Frontier of Nepal. May 1848.

On this trip I had the pleasure of my friend Mr. Charles Barnes' company, who, by kindly taking charge of our camp and little commissariat, left me wholly unimpeded and free to collect and observe. We had a kind loan of Major Crommelin's small tent; and our party consisted of about twenty men, laden with provisions, instruments, papers for my plants, blankets, and cooking utensils. These people were principally Lepchas: each carried about 100 to 150 lbs. weight, in large conical baskets, shaped like gigantic strawberry pottles, only truncated at the base. A slip of bamboo passing across the forehead, aided by two shoulder-straps, supports the weight; in the hand they have always a bamboo staff, with which, when resting, to prop the basket, and relieve the neck and forehead from the great strain.* It is almost incredible how far and how steadily these men will thus transport enormous loads. Our tent, when wet, weighed nearly 200 lbs.; and yet one man carried it down a steep descent of 5,000 feet, across two spurs of upwards of 1,000 each, forded five rocky streams, and ascended 2,000 feet to our camping-ground, all within twelve hours! Such articles as will not go in the baskets are lashed up with bamboo or cane slips, in a piece of double bamboo wicker-work, enclosing many layers of leaves (generally of *Scitamineæ*), which is waterproof: similar plaited work forms a shed for the head and the baskets, so that these people carry, snail-like, a rude house on their backs. The Lepcha umbrella is a hood of this kind, open in front, fitting over the head, and reaching to the hips. To see a party of natives coursing along in the rain under these apparently awkward, but, save for their weight, most convenient sheds, is sufficiently comical. All the limbs are free.

Tonglo is a mountain about 10,000 feet high, due west from Darjeeling, and it rises from a ridge dividing Nepal from Sikkim. A broad valley, cut up by numerous spurs from the mountains N. and E., and

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* I have remarked goître to be peculiarly common amongst the people who carry the baskets by the head-strap; and in certain Bhothea villages, where the girls support the rice-baskets by the head-strap alone, the disease is universal. Amongst those Bhotheas, too, who convey salt from the Thibetan Passes to the Nepalese villages, it is most prevalent. I cannot but think that congestion of the vessels in the neck may be a very predisposing cause of goître, frequently as it is seen amongst mountain-tribes, where carrying on the head prevails. I am, however, aware that this practice will not account for the affection in many districts.

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from Tonglo itself, separates Tonglo from the Darjeeling spur; and we have as many ascents and descents to make, before reaching its base. From the sanatorium it appears one mass of forest, its sides furrowed by deep ravines, the top a short ridge of a lurid grey green colour. Like all the other Sikkim Sub-Himalaya hills, the outline of Tonglo is tame, everywhere steep, but never precipitous.

The great mountain, Sinchul, on which Darjeeling stands, first catches the S. E. or rainy winds, and so empties the clouds in part, before they reach Tonglo. In the mornings, Tonglo is very frequently visible from Darjeeling, and the heavens blue and clear from its top to the zenith; whilst all the eastern hemisphere, up to the very summit of Darjeeling ridge, shows a dense mass of mist and rain. Except during the rains (from June to September inclusive, when the surrounding scenery is very seldom descried), the mornings are generally the finest part of the day, and the western horizon is invariably clear. At from eight to ten, a. m., the mists rise from the eastward, and gather round Darjeeling. At this time, only, small spotted clouds are collected on Tonglo, which, as the atmosphere becomes more and more loaded with moisture, dilate, unite, and envelope the whole mountain, whose humid flanks then receive a copious supply. By the same rule, the breaking up of the diurnal rain commences from the east, the mists rising first from the Bhootan hills; and it is not till their vapours are dissipated that the then drier wind reaches Tonglo and dispels its shroud too.

Hitherto, Tonglo had only been visited by the Surveyor-General, on the previous year (1847), who obtained, through Government, a reluctant assent from the Sikkim Rajah to his taking observations from its summit. No other European had trodden it.

On May the 19th, we left Darjeeling at a little before noon, and descended a steep spur, from 7,000 to about 2,000 feet above the sea. The zones of arboreous vegetation through which we passed are similar, and similarly disposed, to those noticed during the descent to the Great Runjeet River. First, *Chestnuts, Oak*, and *Magnolia*; second, *Tree-fern*; third, *Palms* (*Calamus*); fourthly, *Plantain*; and then a host of tropical genera. As the native paths lead, of necessity, along the less wooded ridges, the transition is not recognized immediately; but on looking into the gorges on either hand, the relative positions of these conspicuous plants, between the elevations of 6 and 7,000 feet (to which all ascend), is very obvious. Firing the forest is so easy an operation on these great projecting spurs, which are really innumerable, that a good many patches of cultivation are met with at 3,–5,000 feet, the level most affected by the Lepchas and Limbos. Though living in such close proximity, using the same food, and exposed to exactly similar discomforts in climate, &c., these two races retain their widely different manners and customs. They are said to have mixed a little; but still I find no difficulty in recognizing either tribe. I have described the Lepcha as eminently Tartar in features: the Limbo partakes of these peculiarities less decidedly in cut of nose, mouth, and above all, eyes; but he is more markedly trans-Himalayan than even the Lepcha, from the absence of any beard or moustache, which the latter not unfrequently possesses after a meagre fashion. The Limbo is much less pleasing in features and address, more slender and sinewy, does not adopt the queue, lacks the pretty (when clean) cotton cloth, does not carry the Ban (or carving-knife in an open sheath), but the curious "Cookery," or incurved heavy dagger of the Ghorkha (see a picture in Kirkpatrick's 'Nepal,'—I have several of these weapons, which are capital for cutting a road through the forest). I believe the origin of the Limbos to be certainly Mongolian, *i. e.*, from beyond the snow, and their chief residence is Eastern Nepal, where they long were harassed by the Ghorkhas and waged bloody wars. Only within these two days, news has come from Nepal of the Rajah having levied a conscription of 4,000 Limbos, and cantoned them at Cattmandu, where 1,000 died in a few short weeks of cholera. The tribes are now dreadfully alarmed, and at this moment flocking to Darjeeling for protection. Dr. Campbell, the British Resident, tells me that many of them have entered our military service, which the Lepcha abhors. The Limbo houses, which I have seen, are mere hovels, very like and as rude as those of the Irish peasants, with a plaited or grass thatch, curving over the top. The structure is quite unlike the large house with low but pitched roof of the Bhothea and Lepcha, its broad stage or platform, and dairy and piggery underneath. Their language is less harsh (and zezzish, or tsezzish, to coin an expression) than the Lepcha, and is not, I believe, written, like the latter. Another distinction between the Lepcha and the Limbo is, that the first burn and then bury the ashes; while the latter inter their dead. I had a Limbo in my service for a month or two, but though not precisely an "objectionable," he was far from an "interesting character," or such as a traveller seeks to employ, when anxious to make the most of a short residence amongst strange people. I have seen several of their tombs: all were mounds of earth, surrounded with a diminutive paling of sticks, placed cross-wise (like a garden-plot border), and had eggs and pebbles scattered over them. My Lepchas could not interpret this symbol.

The little village, or rather hamlet of Singtam, is near the base of the spur, and inhabited by Lepchas, Limbos, and Murmis, who are decidedly segregated in groups. The soil is a much richer, deeper loam than occurs about Darjeeling, where a stiffer clay prevails; but I did not determine to what this difference between the soil of the upper and lower slopes of the same mountain is owing, whether to the nature of the rock, which from its felspathic nature abounds in alumina* above, or to the presence of other materials tansported, or if it is due to the disintegration of a different rock below. Here no stone was exposed, but a little lower down mica-schist was the prevailing species. In these positions the soil is very fertile, owing in part to the ashes of the tall forest, destroyed to make room for agriculture. *Rice*, of species requiring no irrigation, *Panica*, *Paspala*, *Eleusine*, and *Milium*, are the *Cerealia*,—*Buck-wheat* and *Barley* frequent higher levels. A solitary blackened tree-stump, often hollow, disfigures the fields, and is used as a look-out post, where a watcher guards his field by night from the ravages of the bears and deer, which occasionally fall victims to his poisoned arrow. Nothing is so striking as the great steepness of the cultivated spots. So good a soil, well manured, moreover, by the burnt ashes of the aboriginal vegetation, must be highly productive; but where it coats a steep hill-slope, and is exposed to the rains of five months, it cannot long remain so, and may therefore possibly afford a clue to the wandering habits of the Lepcha, who never holds his land for more than three years, at the expiration of which time he seeks a new site.

The large Bamboo and *Gordonia Wallichii* are the prevailing botanical features of the dry earthy slopes of all these spurs. The latter ascends to 4,000 feet; the former (of this species), scarcely so high. There are, however, so many kinds of Bamboo, they so seldom flower, require so much experience in their native states, and so cautious an examination from the botanist, that it is next to impossible to define the limits of the ten or twelve species easily distinguished by the Lepchas. One, a very large kind, is used for *Choongis*, or water-buckets, it is as thick as a man's thigh ; another for quivers, a third for flutes, a fourth for walking-sticks, again another for plaiting-work (baskets, &c.), and a sixth for arrows ; while a still larger sort serves for bows—the Lepcha bow being always made of a piece of Bamboo. It would take many pages to describe the numerous purposes which the various *Bamboos* serve, even in Sikkim alone. In an economical point of view they may be classed into those which do, and those which do not, split readily. The young shoots of one or more are eaten ; and the seeds of another, raw, or cooked, or made into a fermented drink.

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* The subsoil, or clayey stratum, frequent over the gneiss rock of Darjeeling, contains 30 per cent. of alumina, according to an analysis made for me by my excellent friends Messrs. J. and C. Müller.

By two, p. m., we arrived at the bottom of the first valley, where a stream called Rishi-hoat flows to the Runjeet, over beds of mica-schist, with boulders of gneiss from the hills above. Though the temperature was only 77°, the closeness of the valley and reflected heat from the black soil of the cultivated hills on either bank, rendered the air oppressively hot. Temperature of the water 70°, and that of a little cataract which emptied itself into the stream hard by was 68°. *Chloranthus*, *Ferns*, some fine *Fici* (one producing an enormous edible fruit, which is fleshy and good, especially when stewed), grew on the banks, with a very handsome climbing *Amaranthaceous* plant, which covers the trunks of the loftiest timber-trees, at 5 and 6,000 feet, and completely obscures them. From the river we ascended a very steep cultivated slope (of 35° to our feelings, but steeps always appear very much more abrupt than they really are) : it was covered with a young maize crop. The *Maize* is occasionally hermaphrodite in Sikkim, the bisexual flowers forming an immense drooping panicle, and ripening small grains. This phenomenon is very rare, and the specimens of it are preserved as great curiosities for presents ; Campbell has procured me an excellent one. At a Lepcha village, the population turned out to look at us, men and women together, leaning their arms on one another's shoulders, as school-boys wont to do : the men are active and lively, the women frank, children vastly humorous and chubby. We gave the latter, as usual, some small silver coin, which their parents pierce and hang, together with all sorts of silver and copper ornaments, pebbles, beads made of seed, coarse turquoise, &c., round their little necks.

The head-man of the village wore a peacock's feather in his cap, a thoroughly Chinese symbol of authority. All paid much respect to a very old man, who declared himself above 100, but still had some teeth and black hair left. I could not guess what his age really was, his features being contradictory; the signs of youth I have already mentioned, those of extreme longevity were equally obvious, in the forehead, eyes, complexion, &c. Pigs were the principal live stock, and were carefully tended, and fed out of troughs like English swine. There are several villages on this, the Choongtong spur, all small, and if inhabited by Lepchas, only temporary. The Bhooteas, or Thibetan settlers, are more industrious, and they cultivate the same spot for many years. A *Lysimachia* (like *nemorum*) grew on the ridge, at 3,000 feet elevation, with *Mussænda*, a tree very conspicuous from its snowy calycine leaves, whitening the tree. We arrived, five p. m., at the Little Runjeet River, which flows into the Great Runjeet, to the north of this place. Its bed is rocky and very steep, in a deep forest, with *Marlea* on its banks. The valley was hot (75°) and close, full of innumerable minute flies, which float like specks before the eye. Their bite leaves a spot of extravasated blood under the cuticle.* They are called *Peepsas*, and sometimes disfigure the Lepchas' naked legs so much, that it is surprising they do not resort to wearing some sort of hose. A small wild mulberry, *Morus Indica*, hitherto, I believe, unknown in a wild state, frequents the margin of the river, its fruit is small and not bad eating; together with several *Rubiaceæ*, *Gardeniæ*, and *Rondeletiæ*, *Fici* of six or seven species, some dwarf, others arboreous, *Röttlera* and *Euphorbiaceæ*, many *Cucurbitaceæ*, *Citrus*, *Terebinthaceæ*, *Sterculia*, and a few Ferns. The *Grasses* are not up yet, nor the *Scitamineæ*. Temperature of water, 69°.

On crossing the Little Runjeet by a bridge of logs, we ascended another very sharp and steep ridge from the base of Tonglo, about 500 feet above the river, and then encamped for the night. The soil was bare and burnt, with some aphyllous terrestrial *Orchideæ*. Two species of *Oak* grow at this elevation (3,000 feet): one, with a very small and elegant acorn, is a slender tree; the other, a larger and robust species, has broad acorns in heavy woody cups, and sessile leaves. Large *Bamboo* forms the usual jungle, with two *Calami*, and several

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* If the little sac of blood be not opened, the bite, though small, becomes irritating and annoying.

Ehren del et lith

Reeve Benham & Reeve imp.

Collecting Toddy.

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Fitch del et lith.

Reeve Benham & Reeve, imp

Implements for collecting Toddy.

other dwarf *Palms*, *Epiphytal Orchideæ*, *Fici* trailing on the ground, some with long prostrate ramuli and entirely leafless, but producing a fine crop of ground-figs, greedily eaten by the Lepchas, and not *very* bad. The foliaceous branches are erect, very different and difficult to prove of the same plant, and bear sessile oblong leaves, singularly oblique at the base, very rough, and used for polishing. There are several species of this groupe; one grows at 6,000 feet.*

The night was calm and moonlight, with blue sky and a little cirrhus, no dew or rain. A thermometer sunk two feet stood at 78° both this night and the following morning, which is, no doubt, the average *bottom-heat* required for plants from the bases of the Himalaya, and 55° or 60° for those of Darjeeling. The temperature of the air at the base varies during the year, probably from 50° or 60° at the coldest, to 90° and 100°. At an elevation above 6,000 feet, the mean variations are much less, from 40° to 70°: any greater degree of cold would certainly kill most of the Darjeeling plants, if continued for a day or two.

(*To be continued.*)

BOTANICAL INFORMATION.

TODDYMEN AND TODDY IMPLEMENTS.

PLATES I. *and* II.

Toddy, or *Palm-wine*, is extracted from several kinds of palms; perhaps from none more extensively than from the common cocoa-nut, *Cocos nucifera*,—a tree, of which M. de Tussac says, "Il est difficile de refuser à cet arbre la prééminence pour la beauté sur beaucoup d'autres espèces du genre Palmier. Qu'on se figure une belle colonne de soixante à quatre-vingts pieds d'élevation, dont le chapiteau est formé de feuilles immenses, courbées également en différens sens, et formant un panache dont toutes les parties s'agitent mollement par l'impulsion des vents. Les fleurs produisent assez peu d'effets, quoique en trèsgrand nombre; mais la grappe de fruits, qu'on nomme régime, est par sa richesse un véritable ornement pour cet ordre."

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* One species of this eminently tropical genus grows in Sikkim at nearly 9,000 feet.

One of the cases in the Museum of the Royal Gardens, contains a fine cluster (*régime*) of these fruits, together with some of the many products of the plant. Our stoves, too, exhibit several healthy young plants, from two to eight or ten feet high; most of them still seem sprouting from the husk of the fruit, which, enclosing the seed, was partially buried in the soil to induce germination. Beyond a certain age, however, probably eight or ten years, the cocoa-nut trees are generally found to sicken and die, for want of a saline atmosphere; these palms in tropical regions always affecting the vicinity of the sea or saline rivers, never flourishing far inland.

Our object in the present notice is to give a brief account of the mode of extracting the *Toddy* or *Palm-wine* from this tree, as practised in the Madras Peninsula; and this we are enabled to do through the kindness of J. M. Strachan, Esq., of Teddington Grove, Middlesex, who has presented to our Museum an excellent drawing made on the spot, of Toddymen at their labour (copied at our Tab. I.), together with the implements employed for this purpose (represented at our Tab. II.), accompanied by explanatory notes. These notes, and our illustrative plates, will be better understood if we first extract from Dr. Buchanan Hamilton's 'Travels in Malabar' his account of the process:—

"The *Cocoa-nut Palm*, after having been transplanted, begins to bear in from thirteen to sixteen years. It continues in full vigour for forty years, and lives for about thirty years more, but is then constantly on the decline. When the trees show flower for the first time, a trial is made by cutting a young flowering-branch, to ascertain whether it be fit for producing Palm-wine. If the incision bleeds, it is fit for the latter purpose, and is more valuable than a tree whose flower-branch, when cut, continues dry and is fit only for producing nuts. The Palms fit for wine are then let to the *Tiars*, or *Shanars*, who extract the juice and boil it down to *Jaggary*, or distil it to extract Arrack. In a good soil the trees yield juice all the year; but on a poor soil they are exhausted in six months. A clever workman can manage thirty or forty trees, and pays annually for each from one to one and a half *fanam*. When the spadix, or flowering-branch, is half shot, and the *spatha*, or covering of the flowers, is not yet opened, the *Tiar* cuts off its point, binds the stump round with a leaf, and beats the remaining part of the spadix with a small stick. For fifteen days this operation is repeated, a thin slice being daily removed. The stump then begins to bleed, and a pot is fixed under it to receive the juice, or *Callu*, which the English call *Toddy*. Every day afterwards a thin slice is taken from the surface of the stump, which is then secured by a ligature; but after it has begun to bleed the beating is omitted. The juice is removed once a day. If it be intended for drinking, nothing is put into the pot, and it will keep for three days. On the fourth it becomes sour, and what has not been sold to be drunk while fermenting, is distilled into arrack. In the pots intended to receive juice which is to be boiled to *Jaggary*, a little quick-lime should be put to prevent fermentation, and the juice must be boiled on the same day that it is taken from the tree. Twelve trees daily fill a large vessel with juice, which, when boiled down, gives six balls of *Jaggary*, each worth one *caas*. The cocoa-nut palm, during the season that it is productive, pushes out a new *spadix* once a month; and after each spadix begins to bleed, it continues to yield freely for a month, by which time another is ready to supply its place. The old spadix continues to yield a little juice for another month, after which it withers; so that there are never more than two pots on one tree. Each of these spadices, if allowed to grow, would produce a bunch of nuts, containing from two to twenty. When the nuts are very numerous, they attain but an inconsiderable size, and are of little value; and from seven to ten nuts may be considered as the average produce of each bunch. Trees in a favourable soil produce twelve bunches in the year: ordinary trees give only six bunches. From this it does not appear to me that the gross average produce can be possibly calculated at less than fifty nuts a tree."

EXPLANATION OF THE PLATES.—TAB. I. *and* II.

The plate (Tab. i.) represents three Toddymen, two in the foreground, and the other ascending a *Cocoa-nut tree.* The shed behind is a temporary Toddy-bazaar, generally kept by a woman, who is helping the figure, shown in the attitude of drinking, to another draught of toddy.

The figures in the foreground are represented equipped with the apparatus necessary to their vocation. The ropes, passing round the body of the man on the left side of the first plate, and carried on the left arm of the other, are used in climbing the Cocoa-nut trees, and made of cow or buffalo hide, twisted whilst in its raw state (and are further represented in Plate ii. figs. 9 and 10). The small ladder serves for scaling the trees, to the height of about eight or nine feet from the ground. The small pendent water-tight baskets (Tab. ii. fig. 6), made of tender Cadjans or *Palmyra*-leaves, are used for holding the toddy which is poured into them: and the cases (Plate ii. fig. 1), fastened on the right sides of both figures, contain each a hooked knife (Tab. ii. fig. 3), a small hard-wood stick, or bludgeon, for beating the spadices of the trees (Tab. ii. fig. 4), a wooden strop (Tab. ii. fig. 2) to sharpen the knives (aided by a little emery-powder, carried within the hollow of a small bamboo), and a small bundle of strips of the Cocoa-nut leaf (not represented). These are the implements necessary for the Toddyman's calling.

The Cocoa-nut leaf over the shoulder of the left figure is supposed to be his perquisite, from which he manufactures mats: the manner of making them is by splitting the leaf in twain, and plaiting the fronds together; these mats are used for the purpose of sitting or sleeping upon, and when dry serve for screens, or for the covering of slight verandahs, panáals, &c.

The method of climbing the cocoa-nut tree is this. A loop of rope (Tab. ii. fig. 9) is placed over the feet of the Toddyman to keep them from separating further than the extent allowed by the rope, which in ascending the tree is secured from being hurt by a short gaiter, or guard of thick leather (Tab. ii. figs. 7, 8). The large rope (Tab. ii. fig. 10) is then passed round the tree, as well as round the body of the Toddyman: it is then secured, and forms a sort of band, encircling both the trunk of the tree and the body of the climber. He then raises this larger rope to a level with the arm-pits, and places his feet against the trunk of the tree. By pressing his hands forcibly against the tree, he raises his feet about eighteen inches, and rests the full weight of his person on the large band. He nexts takes hold of the large band by one hand, keeping the other against the tree (as shown in the figure climbing), and, by raising the rope with a sudden jerk, places himself in a position for again lifting his feet; and so the operation of ascending is repeated, till he reaches the top. When he reaches the required height, the rope is shifted from the shoulders to the waist: the man then supports himself with ease and has both his hands free.

The manner of extracting toddy is as follows:—When the spadix is about to flower, the point is cut off and bound round tight with a ligature made of the strip of a branch of the Cocoa-nut tree. It is then beaten or bruised with the bludgeon before mentioned, twice a day, for a week or more; a thin slice being pared off at each time of beating. The spadix thus treated begins to "tear," or emit a juice, which is toddy, and which is collected in a small earthen pot, tied to the spadix, as well as to an upper branch of the tree, for that purpose, (as shown in the plates, Tab. i., and at fig. 5 of Plate ii.)

The Cocoa-nut tree toddy, when fresh drawn and unadulterated, is of a pleasant sweet flavour, but when kept till it becomes acid, it is intoxicating: to render it more so, the fruit and leaves of the thorn-apple (*Datura Stramonium*) are bruised into the jar or pot containing the beverage for sale at the licensed toddy-shops; and in that state it is eagerly drunk by the natives. Toddy produces Jaggary. Arrack is also distilled from toddy, and it makes, besides, a vinegar of tolerable good quality.

Toddy is usually extracted from the Cocoa-nut trees one half of the year, and they yield fruit the other half.

The Toddymen are industrious people of the Seva sect: they eat animal food of all kinds, excepting beef, and drink distilled liquors.

CHINESE "RICE-PAPER," *or* "BOK-SHUNG."

Thanks to our most obliging friend, Capt. Wm. Loring, R.N., who has put us in communication with several intelligent gentlemen now resident in China, we are in a fair way of obtaining correct intelligence relative to many interesting scientific objects, and of having our doubts solved on some important botanical matters. J. H. Layton, Esq., H. B. Majesty's Consul at Amoy, China, has most kindly sent us not only excellent specimens of the *pith* from which the so-called *Rice-paper* is formed, but a model of the knife used in cutting it, and, what is even of more value, the following information.

The substance, commonly called *Rice-paper* by the Chinese, is made from the pith of a plant or tree, which grows principally in the swampy grounds in the province of *Sam-swi*, in the northern part of the island of Formosa, where it is said to form large forests. The bark and rind are, previous to exportation, stripped from the pith, which is then called *Bok-shung*.

The iron knife commonly used for cutting this pith weighs about 2½ lbs., and is of the roughest and coarsest workmanship,* and perhaps not one blade in twenty is sufficiently well tempered to be advantageously used. In cutting, the knife is kept quite steady, the cylindrical pith being moved round and round against the edge of the knife, which is just inserted into the substance, and thus a leaf or sheet is formed resembling the most delicate paper, but rather thick in substance. When brought quickly from the workman's hands the paper is in a damp state. It may have been rendered so, in order to facilitate the smoothing and pressing.

At Chang-chew, the large city of which Amoy is the sea-port, there is only one man who can cut this paper. This person ran away from his master in Formosa, and refuses to teach his trade except for a premium of 60 dollars.

It is said that there is a neat method of joining this paper when broken, and that it is chiefly made from the smaller pieces of the *Bok-shung*, and that the larger pieces are used in medicine in the same way as Epsom salts.

It is in vain to conjecture, from the pith alone, to what plant or tree this exquisitely beautiful substance belongs. The vulgar opinion still generally prevails, that, because it bears the name of *Rice-paper*, it is manufactured from Rice; but the slightest inspection with a microscope exhibits the exquisitely delicate medullary portion of a dicotyledonous stem. Again, from an affinity with the well-known *Shola* † of the East Indies, many have supposed, and even Chinese travellers have declared, that *Rice-paper* is made from this, the *Æschynomene paludosa*. But a comparison of the two will clearly show the difference. Both are light and spongy; but the *Shola* is far less delicate than the *Bok-shung*, and is always exported "peeled," the external coatings being removed; whereas the *Shola* is always sent covered with its thin brown bark. A Chinese drawing of what is said to be *the Rice-paper plant* is in possession of Dr. Lindley, but neither flower nor fruit is represented: —some have conjectured this to be a Malvaceous plant, others Araliaceous. We have seen in the branches of the common Fig, *Ficus Carica*, a copious medulla, very much resembling, in its texture and pure whiteness, that of the *Bok-shung*.

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* The model (of wood) sent would indicate this. It has a very broad straight blade, and a short straight handle, and is more like a small bill-hook (wanting the hook) than a knife.

† Of which floats and buoys for fishermen, and the very light hats of Sincapore, are made.

We have the gratification of knowing that our Consul at Amoy will use his best endeavours to procure flowering specimens of the plant itself.

Mr. SPRUCE'S *Amazonian Plants.*

We have (Dec. 17) just received from Mr. Spruce very interesting accounts of his botanical success in the vicinity of Parà, some particulars of which we shall give in an early number of the Journal. At present we must content ourselves with mentioning that besides some cases of living plants and specimens for the Museum of Kew, &c., there is an Herbarium of 300 species despatched to Mr. Bentham, who, as we have already announced, has kindly undertaken to number and name and distribute them to the subscribers.

M. BORGEAU'S *Plants of the South of Spain.*

M. Borgeau writes to us from Paris, after having successfully accomplished his journey to the south of Spain. He has brought a very large collection with him, of which the fullest subscribers' sets will amount to nearly 600 species, and the smallest to between 3 and 400. A considerable number have proved to be new, and M. Cosson is preparing a descriptive catalogue upon them. We have reason to know that not more than two sets remain in hand; and no wonder, when the beauty of M. Borgeau's specimens is viewed in conjunction with the very moderate cost. Should this notice meet the eyes of any one desirous purchasing a set, we would recommend his writing to "M. Borgeau, No. 8, Rue du Chaume, Paris."

WILLKOMM'S *proposed Botanical Journey into Spain.*

By the death of my lamented father on the 14th of September of this year, and family affairs resulting from it, I have been forced to desist from the execution of my scheme for a scientific tour through Spain and Portugal in the autumn of the current year, as detailed in my prospectus issued on the 1st of July. But I do not intend to relinquish my plan; I am, on the contrary, the more intent on its execution, as I am enabled, by the inheritance left to me by my late father, to perform the tour partly with my own means. Therefore I have now irrevocably fixed the term of my departure in April of the ensuing year, and intend to visit at first the north-eastern parts of Spain. The plan, as developed by me in the printed prospectus, will be kept constantly in view, though slightly altered in the order of the successive stages of the journey, in regard to the inverted order of the seasons. All who may intend to take part in the results of my journey will please to address themselves, *post paid*, before the 1st of April, to me (Leipzig, Plauenscher Platz, No. 1), and after this date to Mr. Bernhard Auerswald, teacher at the "Erste Bürgerschule" (Peterstrasse, No. 7). The English subscribers will receive the collections directly from Spain by the steamers of the Peninsular Company. The first series, containing the plants of eastern, northern, and north-western Spain, and the north of Portugal, will arrive in England in December 1850, at latest. It is to be hoped that on receiving their parcels the subscribers will not defer to pay the amount of their subscription in full, or at least the half of it; as only under this condition am I enabled to execute the tour sketched out, so completely as it is desirable for the interests of science and of the subscribers themselves. The instalments I beg may be remitted in good bills to Mr. *Charles Unthoff*, Saxon Consul at Cadiz.

MAURICE WILLKOMM.

Leipzig, Nov. 16, 1849.

Mr. DRUMMOND'S *Plants of South-west Australia.*

The friends of Botany will be glad to learn that fourteen sets of most interesting and well-preserved specimens of South-west Australian plants have been received by Mr. Havard (Young-street, Kensington) for distribution to the subscribers. Each collection consists of 550 species, including many entirely new, and of a most remarkable character, and others of the greatest rarity and very different from those sent by the same zealous and meritorious naturalist in his former transmissions. We do not denominate them "Swan River" plants, because they are procured far away from that settlement, during journeys undertaken by Mr. Drummond to the south and east, in an attempt to reach Lucky Bay, which intention was frustrated by a dreadful attack of ophthalmia, rendering him quite blind for a fortnight, and able to travel after that for some time only during the night, his eyes not being able to bear the light of day. The writer of this notice can safely say that he has rarely seen so great a number of fine and remarkable species arrive at one time from any country. The price, as usual, is £2 the hundred species, together with the share of freight, &c. Applications may be made to Mr. Havard.

Some particulars of Mr. Drummond's discoveries during one of the above journeys, namely that to Cape Riche (a second visit to that fertile locality), are given in the preceding volume of our present Journal, p. 247. But of the previous excursion, that destined for Lucky Bay, and which, from the illness above mentioned, extended only to about one hundred miles from the Swan River, the particulars have only now reached us. The plants gathered on this tour constitute what Mr. Drummond has marked as a "*Supplement*" to the 450 now also sent, collected during the second Cape Riche journey, and he alludes to some of them in the following extracts.

"Several of the *Proteaceæ* are very interesting: among them is a very curious and beautiful *Dryandra*, with long, entire, and very narrow leaves. There are two *Grevilliæ*, one with large fennel-like leaves, and flowers so compacted as almost to resemble a *Banksia*, and of a deep rose-colour; the other has large glaucous holly-like leaves, in habit resembling a robust *Hakea*. I found several remarkable Myrtaceous plants; one appears to be a new genus, with flowers (though smaller) as handsome as those of a pomegranate, which they resemble in shape and colour. It is prostrate with dotted heath-like leaves, and a free(!) seedvessel within the permanent pitcher-shaped tube of the calyx; in this particular resembling Dr. Lindley's beautiful *Salisia pulchella*, of which I now send excellent specimens. There are some remarkable *Compositæ*, and one, that I take to be of this order, has the general aspect of an annual *Myosotis,* with three kinds of florets; fertile female florets, with a two-cleft style; an equal number of barren female, with a club-shaped three-lobed style; and minute cup-shaped florets, which contain the pollen. You will also receive a singular plant, resembling *Polycarpon,* but having the seeds in three distinct cells, and attached by filaments to the valves. There are three sessile stigmas, three to five stamens, and five sepals, but the three inner ones are not on the same level with the two outer divisions, and may perhaps be considered petals. The plant is a bushy annual, about one foot high, growing in a dried-up lake."

NOTICES OF BOOKS.

De Vriese, *Analecta Goodenoviarum.*

We can announce the appearance of the two first numbers of the above valuable work, under the title of "*Analecta Goodenoviarum ad auctoritatem Herbariorum Musei Cæsarei Vindobonensis, Lessertii, Hookeri, Lindleji, Preissii, aliorum, proponit* Guil. Henr. De Vriese," &c. &c. After some preliminary observations, the first number is devoted to the genera, 1. *Dampiera,* Br., "*recensio nova,*" of which thirty-three species are enumerated :—and *Scævola,* L., "justis circumscripta limitibus," including nine species.

The second number commences with an article entitled "*De novis generibus Goodenoviarum.*" These new genera are made at the expense of *Scævola*; and are, 1. *Temminckia* (of which *Scævola Chamissoniana,* Gaud. in Freyc., Voy. Bot. t. 81, may be considered the type), eight species. 2. *Camphusia* (*Scævola glabra,* Hook. et Arn.), one species. 3. *Merkusia* (*Scævola crassifolia,* Labill., &c.), twenty-five species. The remaining article of this number is called "*Goodenoviæ Mitchellianæ,*" including 1. *Linschotenia,* nov. gen., one species. 2. *Goodenia,* of which four species are enumerated, one new; and 3. *Velleya,* one new species. We trust the remaining numbers will soon follow.

Contributions to the Botany of WESTERN INDIA;
by N. A. DALZELL, ESQ., M.A.

[Mr. Dalzell is one of the few zealous and intelligent botanists residing in the Bombay Presidency, a region many parts of which have assuredly been less explored than almost any portion of the vast possessions of the East India Company; and we are sure that our readers will be glad to see in these pages occasional notices of new genera and species from so able a naturalist.—ED.]

LEGUMINOSÆ.

PHASEOLUS.

Ph. *sepiarius*; volubilis glaber, foliolis submembranaceis late ovatis acuminatis mucronatis basi 3-nerviis, foliolis lateralibus inæquilateris basi subtruncatis, stipulis basin versus aduatis ovato-lanceolatis, pedunculis folio subduplo longioribus, floribus racemoso-capitatis, pedicellis geminis e glandularum basi ortis, calycis laciniis subulatis 3-nerviis, labio superiore profunde bidentato, bracteolis sub calyce linearibus acutis pedicelli longitudine, legumine tereti stricto polyspermo piloso pilis brevibus brunneis nitentibus.

Semina reniformia. *Flores* majusculi, rosei. *Radix* tuberosa, edulis.—Crescit undique in sepibus; *fl.* Sept.

Ph. *setulosus*; volubilis, ramis petiolis pedunculisque setulis sparsis rufo-brunneis retrorsum hispidulis, foliolis herbaceis glabris rhombeo-ovatis vix acutis margine ciliolatis, foliolis lateralibus inæquilateris, stipulis ovatis obtusis ciliatis infra medium adnatis multinerviis, pedunculis folio brevioribus, floribus racemoso-capitatis, pedicellis brevissimis geminis e glandularum basi ortis, calycis glabri campanulati labio superiore subintegro truncato, inferiore brevissime 3-dentato, dentibus obtusis, bracteolis ciliolatis lanceolatis calycem æquantibus, legumine tereti stricto gracili setulis minutis scabro, polyspermo bipollicari, seminibus cylindricis 12–13.

Flowers of the same size and colour as *Ph. trinervis*. The seeds are enveloped in and divided by a spongy kind of pith, and are furnished with a membranous transparent covering over the testa, which envelope is minutely striated, and takes its origin from round the base of the podosperm.—Crescit in provinciâ Malwan; *fl.* Sept.

FLEMINGIA.

F. tuberosa; perennis, radice tuberosa e basi ramosa prostrata, ramis ramulisque parce patenti-pilosulis vel glabris longissimis filiformibus, foliis trifoliolatis foliolis anguste lanceolatis acutis eglandulosis subtus in nervis pilosulis marginibus recurvis lateralibus inæquilateris, petiolo piloso foliolis paulo breviore, stipulis lineari-subulatis basi connatis caducissimis, racemis axillaribus dichotomo-paniculatis paucifloris folio longioribus, floribus geminis in apice pedunculi filiformis subsessilibus, ovario pubescente biovulato, legumine glabro calycem pilosum æquante.

Flores lilacini. *Calyx* infra medium æqualiter 5-fidus, laciniis linearibus acutis 3-nerviis. *Corolla* calyce paulo longior. *Vexillum* latum, ecallosum, dorso pubescens, calcare carnosulo inflexo; *alæ* latæ, obtusæ; *carina* sinistrorsum contorta. *Filamentum* vexillare basi geniculatum ibique dente brevi obtusissimo instructum. *Stigma* penicillatum. *Legumen* medio paulo constrictum, apicem versus transverse reticulatum. *Tuber* bipollicare, esculentum.—Crescit in provinciâ Malwan; *fl.* Sept.

CROTALARIA.

C. triquetra; annua e basi ramosa, ramis prostratis acute trigonis patenti-pilosis, stipulis ovatis acutis reflexis, foliis oblongo-ellipticis basi subcordatis brevi-petiolatis supra glabris subtus sparse patenti-pilosis, racemis oppositifoliis folio 6–7-plo longioribus pauci-(3)-floris, floribus mediocribus distantibus pedicellatis, bracteis triangularibus acutis, bracteolis sub calyce minutis setaceis, pedicello calycem subæquante, calycis adpresse villosi 5-partiti laciniis acutis subæqualibus vexillo dimidio brevioribus, ovario multiovulato, legumine adpresse villoso stipitato oblongo calyce 3–4-plo longiore, vexillo suborbiculari dorso apicem versus sericeo, stipulis petiolisque æquilongis.

Folia 1¼ poll. longa, 7 lineas lata. *Racemi* trigoni, 6-pollicares.—Crescit in provinciâ Malwan; *fl.* Sept.

This belongs to Wight and Arnott's section "*diffusæ*," and differs from all in that section by its acutely trigonal stems and branches.

C. lutescens; annua erecta elata parce ramosa glabra, ramis teretibus, stipulis nullis, foliis elliptico-oblongis utrinque glabris junioribus interdum subtus parce adpresse villosulis, racemis terminalibus simplicibus paucifloris, floribus majusculis distantibus longe pedicellatis, bracteis persistentibus bracteolisque sub calyce subulatis minutis, pedicello calycem æquante, calycis glabri laciniis superioribus subulatis vexillo dimidio brevioribus, ovario multiovulato, legumine glabro cylindrico stipitato calyce 3-plo longiore, vexillo amplo pollicari cordato-ovato acutiusculo dorso multistriato apice parce pilosulo sub anthesi omnino reflexo, alis carina brevioribus, carina apice contorta dorso linea pilosa instructa.

Folia 2–$2\frac{1}{2}$ poll. longa, 10–15 lin. lata, pallida, lutescentia. *C. pedunculari* affinis, sed folia multo latiora, nec acuminata.—Crescit in provinciâ Malwan; *fl.* Aug. et Sept.

Clitoria.

C. biflora; caule erecto lineis pilosis striato, foliolis ovatis vel lanceolatis acutis, supra parce subtus confertim strigosis, stipulis stipellisque setaceis, pedunculis brevissimis bifloris, bracteis parvis lanceolato-acuminatis bracteolis amplis ovatis acuminatis, calycis tubulosi pilosi dentibus setaceo-acuminatis, vexillo glaberrimo, ovario sericeo.—Crescit ubique; *fl.* Sept. Flowers half the size of those of *C. Ternatea*, pale blue.

Macronyx (*Subtribe* Galegeæ), Genus novum.

Gen. Char. *Calyx* tubulosus, bilabiatus, labio superiore bi- inferiore tridentato. *Corollæ* papilionaceæ *petala* longe unguiculata, subæquilonga; *vexillum* rotundatum, sub anthesi reflexum; *alæ* liberæ, strictæ, oblongæ, obtusæ; *carinæ* obtusæ *petala* superne leviter cohærentia, alis paululum breviora. *Stamina* 10, alterna breviora, filamento vexillari libero. *Antheræ* rotundatæ, conformes. *Ovarium* pluri-ovulatum, *ovulis* funiculisque compressis æquilongis; *stylus* brevis, incurvus; *stigma* capitatum. *Legumen* compressum, lineare, rectum, strigosum, marginibus incrassatis, valvis inter semina cohærentibus, 7–8-spermum. Herba *annua*, *facie* Lathyri Nissolia; foliis *simplicibus*, pedunculis *unifloris*; floribus *parvis*.

*M. strigosus.**

Herba annua, diffusa, caulibus adscendentibus, filiformibus, strigosis, foliis simplicibus, linearibus vel anguste ellipticis, mucronatis, 3-nerviis, nervis duobus marginalibus, intermedio penninervio: stipulis parvis, subulatis, petiolo brevi bistipellato æqualibus. Pedunculi axillares, solitarii vel gemini, capillares, folio breviores, uniflori. *Calyx* 1 lin. longus, strigosus, dentibus e basi lata subulatis, infimo paulo longiore. *Petalorum ungues* filiformes, calycis tubum æquantes. *Corolla* 2 lin. longa, cærulea; *vexillum* dorso strigosum, margine ciliatum. *Rami* teretes, 5–6 poll. longi; folia pollicaria, 2 lin. lata. *Legumen* 8–9 lin. longum, 1–1½ lin. latum.—In locis lapidosis frequens. Quoad habitum, *Orobi* species ad memoriam revocat. Floret mense Augusto. Genus *Tephrosiæ* affine.

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* A nearly-allied species of this genus, if not identical with it, is the *Tephrosia tenuis*, Wall. Cat. No. 5970 (from Sezaen, 1826), which our friend Captain Munro also detected at Futtehpore, in Sikri.—Ed.

INDIGOFERA.

I. triquetra (non Meyeni); perennis, caulibus e radice lignosa plurimis herbaceis acute trigonis prostratis apice adscendentibus glabris, foliis subsessilibus ellipticis mucronatis supra glabris subtus strigosis pellucido-punctatis 10 lin. longis 6 lin. latis, stipulis subulatis, racemis axillaribus elongatis folio 3–4-plo longioribus multi-(20–25)-floris, rachi acute trigona glabra, floribus (purpureis) brevissime pedunculatis, pedunculis fructiferis reflexis, calycis 5-partiti laciniis subulatis sub anthesi patentibus pilis albidis strigosis, corolla calyce duplo longiore, vexillo rotundato emarginato dorso strigoso, carina apice pubescente, antheris apiculatis, ovario 6-ovulato pilis reflexis albidis strigoso, legumine lineari apice mucronato tetragono tetraptero 5-spermo 6–7 lin. longo lineam lato.—Crescit in collibus saxosis provinciæ Malwan.

DALBERGIA.

D. monosperma; frutex volubilis, foliolis 5 alternis obovatis vel cuneato-ovalibus apice mucronulatis supra glaberrimis subtus glaucescentibus minute puberulis, petiolis pedunculisque pubescentibus, racemis axillaribus solitariis vel geminis simplicibus paucifloris folio multo brevioribus, calycis glabri laciniis rotundatis parvis, corolla alba calyce subduplo longiore, staminibus 10 in vaginam supra fissam coalitis, antheris transverse dehiscentibus, ovario glabro 1-ovulato, stipulis linearibus ferrugineo-tomentosis, legumine pollicari obscure reticulato lunulato 1-spermo, semine compresso reniformi.—Crescit in collibus provinciæ Malwan; *fl.* Jun.

I was at first disposed to take this for *D. congesta*, but there are too

many points of difference to allow this opinion to be tenable. In this species there are no fine parallel diverging veins; the upper surface of the leaves is perfectly glabrous, even in the youngest ones; the racemes are always simple, and the stamens 10,—the dehiscence of these is peculiar.

D. acaciæfolia; scandens fruticosa, staminibus monadelphis, foliis alternis foliolis 20–24-jugis alternis linearibus apice obtusis vel emarginatis basi inæquilateris supra subglabris nitidis subtus strigosis, petiolis paniculisque ferrugineo-tomentosis, paniculis axillaribus terminalibusque folio multo brevioribus, calyce pubescenti basi bibracteolato 5-dentato dentibus obtusis, ovario stipitato glaberrimo 3-ovulato, legumine ?—Crescit in provinciâ Canara; *fl.* Aprili.

A very distinct species. Leaves 5–6 inches long; leaflets 9 lines long, 2½ lines broad.

PONGAMIA.

P. Canarensis; fruticosa scandens, foliis imparipinnatis foliolis 7–10-jugis oppositis brevi-petiolatis oblongo-lanceolatis supra glabris subtus strigosis, paniculis terminalibus folio brevioribus ferrugineo-tomentosis, pedicellis ternis in pedunculo communi apice fasciculatis, staminibus basi et apice diadelphis medio monadelphis, ovarium hirsuto 2–3-ovulato, legumine ?— Crescit in Canara prope Garsuppa; *fl.* Aprili.

OBS. The panicle is composed of simple racemes, on which the peduncles, of equal length with the pedicels, are arranged. The calyx is bibracteolate, wide, cup-shaped, having a ring of dense hairs around the inside of its mouth. Vexillum with 2 callosities at the base of its limb, which run down the short claw. The leaflets are 2–2½ inches long and ½ inch broad, the length of the leaf one foot, with a channelled petiole. Stipules semi-ovate, broad, covered with ferruginous hairs.

BALSAMINACEÆ.

IMPATIENS.

I. pulcherrima; caule erecto herbaceo glabro simplici vel ramoso, foliis alternis longiuscule petiolatis ovatis acuminatis crenato-serratis serraturis setigeris supra hispidulo-scabridis subtus glaucis glaberrimis, petiolis apicem versus glanduloso-setigeris, pedicellis axillaribus binis v. ternis unifloris folio dimidio brevioribus, sepalis lateralibus

minutis subulatis posteriore amplo orbiculari apice bifido dorso medio aculeato-cuspidato anteriore cucullato mucronato, basi in calcar filiforme pedicello longius contracto, petalis fere ad basin divisis segmentis cuneato-obovatis apice bilobis segmento anteriore ampliore, fructu medio puberulo demum glabrato ovato-oblongo obtusissime rostrato 12–14-spermo, pedicellis fructiferis erectis apice cernuis.

Herba sesqui- bipedalis. *Folium* cum petiolo sesquipollicari 6–7 poll. longum, 2½ poll. latum. *Flores* rosei, ampli, pulcherrimi, diametro 2½ poll. *Calcar* 2¼ poll. longum.—Crescit in umbrosis prope Warree, in Concano australi; *fl.* Aug.

XANTHOXYLEÆ.

DIPETALUM. *Genus novum.*

GEN. CHAR. *Flores* dioici. *Calyx ? Corollæ petala* 2, calyce multo majora, profunde concava, cupuliformia, pellucido-punctata, æstivatione imbricata. *Floris masculi stamina* 6; ovarii rudimentum apice bifidum.—Frutex *inermis*, foliis *alternis trifoliolatis*, foliolis *elliptico-lanceolatis, æqualiter petiolulatis, utrinque acuminatis, glabris, pellucido-punctatis, integris*; paniculis *terminalibus*.

D. biloculare.

This is without doubt the *Toddalia bilocularis* of Messrs. Wight and Arnott, who place it in the genus *Toddalia* with strong marks of doubt, the flowers never having been seen by these authors. I met with this shrub in Canara last April: at that time the buds were scarcely formed, but after much searching I procured two half-expanded flowers, which will be an apology for the imperfection of the description.

ANACARDIEÆ.

GLYCYCARPUS. *Genus novum.*

GEN. CHAR. *Flores* polygamo-dioici. *Calyx* quadripartitus, persistens; laciniis ovatis, obtusis. *Corollæ petala* 4, sub disco hypogyno 4-crenato inserta, oblongo-linearia, æstivatione imbricata. *Stamina* 4, sub disci margine inserta, cum petalis alterna iisque breviora. *Filamenta* libera, *antheræ* introrsæ biloculares, longitudinaliter dehiscentes. In floribus masculis ovarii rudimentum nullum. In flore fertili *ovarium* unicum, liberum, sessile, uniloculare: *ovulum* unicum, ex apice funiculi complanati e basi loculi adscendentis pendulum; *stylus* brevissimus;

stigma capitato-discoideum. *Drupa* supera, transverse oblonga, depressa, carne parca, pulposa, dulci, esculenta; *putamine* crustaceo, monospermo. *Embryonis* exalbuminosi *cotyledones* crassæ, profunde plano-convexæ.—Arbor *Indica parva*; foliis *alternis petiolatis, simplicibus, oblongis, penninerviis, integerrimis*; petiolo *nudo*; floribus *racemosis, parvis*.—Crescit raro in Concano australi; *fl.* Feb.; fructum maturum habet in Aprili.

G. racemosa.

The tree, on which this genus is founded, agrees in many points with the *Holigarna racemosa*; but, unless we suppose some unaccountable errors to exist in Roxburgh's description of that tree, it must be very different, the superior fruit being a sufficient mark of distinction. I propose that my tree, however, be called *G. racemosa.*

VITACEÆ.

Vitis.

V. discolor; glabra, caule ramisque acute 5–6-angulatis rubris, stipulis late ovatis obtusis auriculatis, foliis petiolatis ovatis vel oblongo-lanceolatis acuminatis basi cordatis sinu lato vel oblique truncatis herbaceis serratis serraturis setigeris supra intense viridibus subtus nitentibus purpureis, umbellis oppositifoliis pedunculatis petiolo duplo longioribus, pedunculi ramis 4–5 basi bracteis obtusis suffultis, petalis cohærentibus rubris, stylo conspicuo, baccis nigris nitidis pisi majoris magnitudine, pedunculi interdum cirrhiferi cirrhis simplicibus.

Species pulchra et insignis, tota folii pagina superiore excepta rubra. *Folia* 3–6 poll. longa, $1\frac{1}{2}$–3 poll. lata: *petiolus* angulatus, canaliculatus.—Crescit in umbrosis Concani utriusque; *fl.* Aug.; fruct. Oct.

ANONACEÆ.

Polyalthia (*Oxymitra*).

P. cardiopetala; foliis obovato-oblongis breve petiolatis repente acuminatis glaberrimis marginibus undulatis, floribus supra axillaribus solitariis nutantibus, pedicellis brevibus petiolo æqualibus, basi bi-tri-bracteolatis, sepalis rotundatis velutinis, petalis exterioribus oblongis cucullatis interioribus minoribus in columnam mitræformem connatis omnibus velutinis.—Fructum non vidi. Crescit in Canara; *fl.* Aprili.

The leaves of this species are 7–8 inches long, and 2 broad within two inches of the apex, whence they taper gradually to the base. The inner petals are singularly marked with the figure of a heart. This is a small tree: whether *P. fruticans* of DC. is distinct, the description of that species is too short to enable me to decide.

POLYGALACEÆ.

POLYGALA.

P. campestris; 4–5-uncialis annua glauca, caule erecto tereti pubescente basi parce ramoso, ramis adscendentibus, foliis subsessilibus glabris linearibus basin versus attenuatis apice mucronulatis marginibus recurvis, floribus inferioribus 1–2 solitariis extra-axillaribus tribracteolatis cernuis, superioribus racemosis multifloris, racemo supra-axillari rarissime oppositifolio folio unciali 3–4-plo longiore, alis foliaceis oblique ovatis mucronulatis capsula longioribus, sepalo supremo ciliato, carina cristata, capsula subrotunda obliqua emarginata margine ciliata.

P. Wightianæ affinis, sed caules et racemi semper pubescentes, et flores inferiores in caule solitarii.—Crescit in planitiebus graminosis provinciæ Malwan; *fl.* Junio, Julio. *Flores* lutei.

CAPPARIDEÆ.

CAPPARIS.

C. formosa; fruticosa parva erecta inermis, foliis ovatis vel oblongis utrinque acutis vel lanceolatis junioribus membranaceis tomento stellato facile detergibili vestitis veteribus coriaceis glabris reticulato-venosis nitidis 5 poll. longis 2–2½ poll. latis, pedunculis corymboso-racemosis pauci-(5–6)-floris: in ramorum et ramulorum axillarium summitate, pedicellis pollicaribus bracteisque subulatis ferrugineo-tomentosis, floribus amplis (diametro 5 poll.) speciosis pallide cæruleis, petalis planis sub anthesi patentibus duobus inferioribus ita adpressis ut in labellum amplum coalita videntur et corollæ tripetaloideæ speciem exhibent, labello basi macula flava pubescente discoidali notato, filamentis petalisque æquilongis, ovario oblongo tomentoso.—Fructum non vidi. Crescit in umbrosis provinciæ Canara; *fl.* Aprili.

This is the most beautiful and showy *Capparis* with which I am acquainted, and far surpasses any Indian species which I have seen. Part of Canara was, I believe, Heyne's region: can this be his *C. cærulea?*

C. tener; fruticosa glabra ramosa, stipulis aculeiformibus brevibus uncinatis, foliis brevi-petiolatis ovato-lanceolatis obtuse acuminatis glaberrimis membranaceis diaphanis, pedicellis filiformibus axillaribus solitariis unifloris pollicaribus folio brevioribus.—Crescit in montibus Syhadree inter lat. 16° et 19°.

This species has small flowers, leaves two inches long and one broad, covered with minute warts on the under side. The solitary pedicels are scarcely thicker than a horse-hair. The whole plant has a very delicate appearance.

EUPHORBIACEÆ. *Tribe* Crotoneæ, *Bl.*

AGROSTISTACHYS. *Genus novum.*

Flores dioici. MASC. *Calyx* bi- trifidus. *Corollæ petala* 6, glandulæ 6, petalis alternæ. *Stamina* 10, filamenta basibus connata; *antheræ* loculis distinctis infra apicem filamenti appensis, loculorum valvulis inæqualibus. FŒM. *Calyx* 5-partitus; *petala* 5; *ovarium* basi glandulis 5 petalis alternis stipatum, 3-loculare, loculis uniovulatis. *Styli* 3, breves, bifidi, lobis obtusis.—Frutex, foliis *alternis, petiolatis, oblongis, utrinque longe acuminatis, serrato-dentatis, glabris.* Floribus *masculis spicatis*, spicis *supra-axillaribus, parvis, locustæformibus.* Floribus fœmineis *solitariis, pedicellatis*, pedicellis *basi bracteis* 3–5 *squamæformibus instructis.* Capsula 3-*cocca*, coccis *bivalvibus, monospermis*, seminibus *pisi magnitudine.*

A. Indica.—Crescit in montibus Syhadree, lat. 16°.

A rare shrub, rising to the height of 5 feet. The leaves are 15 inches in length (including a petiole of 3 inches), and 4 inches broad. The inflorescence is singular, in minute short spikelets like those of grasses, in a row above the axils of the leaves, and sometimes fascicled. From the interior of each of the closely imbricated bracts rises a short articulated pedicel, having 2 bracteoles at its base, and terminated by a solitary flower of equal length with the pedicel.

(To be continued.)

DECADES OF FUNGI: *by the* REV. M. J. BERKELEY, M.A., F.L.S.

(*Continued from* vol. i. p. 239.)

Decades XXV. *to* XXX.

Sikkim Himalaya Fungi, collected by Dr. J. D. Hooker.

The present series contains the greater part of the species of *Agaricini* collected in and about Darjeeling, by Dr. Hooker. I think it best to defer the general observations I have to make till I have gone completely through the collection, a task all but finished. I wish merely for the present to guard against a reproach made in the case of Persoon, when describing the Fungi of Freycinet's Voyage, namely, that he had described everything as new, without reference to species already enrolled by mycologists. The truth is, that every species has been most severely scrutinized, and it is only after long study that I have felt myself compelled to propose so many new species. In the *Agaricini*, though several species have close allies in Europe, a vast portion of the forms are altogether new and peculiar, and often on a scale of the greatest magnificence. The new species in the other tribes are not so numerous, but in *Boletus* the same magnificence and novelty is exhibited. The Agarics seem to form far the greater portion of the Fungi of the country, and amongst the twenty-eight sections into which Fries has divided the genus, eight only are without a representative. It is curious, however, that the genera *Cortinarius* and *Lactarius* are altogether wanting in the collection, though there are at least four *Russulæ*.

241. *Agaricus* (Amanita) *regalis*, n. s.; pileo explanato areolato sicco, centro carnoso, margine tenui sulcato; stipite valido exannulato basi bulboso; lamellis latis subliberis. Hook. fil., No. 108, cum ic.

HAB. On the ground. Jillapahar, 7,500 feet. August. Rare.

Inodorous, firm, rather tough. Pileus 5–6 inches broad, expanded, at length somewhat depressed, greyish brown, nearly smooth but areolate, thick in the centre; margin thin, sulcato-striate. Stem of the same colour as the pileus, ringless, 8 inches high, 1 inch thick, abruptly bulbous, transversely floccose, cracked and torn, solid and white within; bulb tinged with red, retaining scarcely any traces of the volva. Gills broad, ventricose, crowded, almost free, but attenuated behind.

A noble species, which cannot be confounded with any in the small section to which it belongs. There is no trace of a ring either in the drawing or specimens.

242. *A.* (Amanita) *eriophorus*, n. s.; pileo expanso umbonato centro viscoso lævi, margine striato obscure floccoso; stipite valido lanato bulboso; lamellis confertis latis adnatis. Hook. fil., No. 111, cum ic.

HAB. On the ground. Darjeeling, 7,500 feet. September. Rare.

Firm, inodorous. Pileus 5 inches across, expanded, with an obtuse broad umbo, cinereous, gelatinous in the centre when moist, obscurely flocculent elsewhere; margin shortly striate. Stem 8 inches high, more than half an inch thick, pale violet, bulbous at the base, clothed with dense down which is disposed here and there in transverse scales, solid but spongy in the centre. Gills broad, crowded, very slightly rounded behind, adnate.

There seems to be in this, as in *A. regalis* and *A. Berkeleii*, no trace of a ring. Like those, it is a very distinct and splendid species. Though bulbous, the bulb is not margined, and exhibits no trace of a volva.

243. *A.* (Amanita) *Berkeleii*, Hook. fil.; giganteus; pileo carnoso firmo subcoriaceo expanso demum depresso fuligineo medio areolato, margine estriato furfuraceo; stipite valido subæquali solido concolore; annulo obsoleto; lamellis latiusculis confertis albis subliberis. Hook. fil., No. 93, cum ic.

On the ground. Darjeeling, 7,500 feet. June to August. Not rare.

Inodorous, firm. Pileus 7 inches or more across, fleshy, expanded, at length depressed, dry, rather shining, sooty grey; cuticle in the centre tinged with yellow, breaking up into polygonal areæ, margin not striate, furfuraceous, slightly inflected. Stem 9 inches high, 1½ thick, solid, dark like the pileus, somewhat scaly and flocculent, nearly equal, penetrating into the soil, blunt below. Ring obsolete. Gills moderately broad ($\frac{2}{3}$ of an inch) somewhat ventricose and waved, crowded, pure white, free or slightly adnexed, obtuse behind or acute.

A noble species, which cannot be confounded with any other. Its nearest ally is probably *A. excelsus*, from which it differs in its firm, almost leathery substance, furfuraceous margin, &c. The ring, if present at all, is soon broken up. There is a smaller variety. The stem is also sometimes bulbous, and the pileus but little areolate.

* *A. excoriatus*, Fr. Hook. fil., No. 11, cum ic.

Hab. In hot valleys on the bare earth. Darjeeling. May. Forming large mushroom-beds.

244. *A.* (Lepiota) *deliciolum*, n. s.; pileo ovato obtuso niveo glabro; stipite gracili niveo roselloque fistuloso basi subincrassato; annulo superiore; lamellis angustis distantibus liberis. Hook. fil., No. 40, cum ic.

Hab. In the hollow of dead trees. Darjeeling, 8,000 feet. May. Very rare.

Inodorous. Pileus 1 inch high, ⅔ broad, ovate, obtuse, snow-white, tolerably thick for the size of the species, smooth. Stem more than 2 inches high, 1–1½ line thick, slightly incrassated at the base, white tinged with rose, rather silky. Ring superior, subpersistent. Gills rather narrow, pure white, rounded behind, free.

Exceedingly delicate and beautiful; a very nearly allied species, at present undescribed, occurs in Ceylon. The smooth pileus and distant gills at once distinguish it from *A. clypeolarius.*

245. *A.* (Armillaria) *horrens,* n. s.; cæspitosus; pileo e convexo plano, margine subrepando verrucis conicis fuscis exasperato; stipite valido supra ample annulato floccoso squamoso deorsum cavo; lamellis postice subrotundatis lineatim decurrentibus. Hook. fil., No. 67, cum ic.

Hab. On bark of old trees, &c. Darjeeling, 7,500 feet. June and July.

Tufted, inodorous, between fleshy and leathery. Pilei 2 inches broad, convex, with the borders arched, at length flattened, liver-coloured, rough with conical dark-brown warts; substance pinkish. Stem 3 inches or more high, ½ an inch or more thick, of the same colour as the pileus, darker below, floccoso-squamose, furnished with a broad, reflected, persistent, reddish ring. Gills moderately broad, tinged with pink, rounded behind, but lineato-decurrent.

Allied to *A. melleus,* but differing in its tougher substance, conical warts, hollow stem, and other points. This and the four following species are closely related. They vary somewhat in substance; some might be placed in *Lentinus,* while others are of too tender and fugitive a texture to be so classified. All, at least, must be placed in the same genus, unless the closest natural affinities are to be violated; and the second is so like *A. melleus,* that I had at first considered it a mere variety. *A. vagans,* Fr., which is taken up from Battarra, exhibits precisely the peculiarity of these species, in which the gills "longe in conum obversum decurrunt."

246. *A.* (Armillaria) *varus*, n. s.; pileo e convexo plano sicco, margine repando; stipite flexuoso curvo solido e basi attenuato; annulo amplo superiore; lamellis pallidis lineatim decurrentibus. Hook. fil., No. 2, cum ic.

Hab. On rotten timber. Sinchul, 8,600 feet. April to June.

Tufted, inodorous. Pileus 2 inches across, at first convex, then plane or even depressed, pale umber, with sometimes a reddish tint, smooth, dry, fleshy, firm, rather tough; margin strongly arched. Stem 4 inches high, $\frac{1}{3}$ inch thick, incrassated and obtuse below, attenuated upwards, darker than the pileus, blackish towards the base, solid, nearly smooth. Ring large, erect, white. Gills moderately broad, distant, pallid, decurrent, quite thread-like at the base, either continued down to the ring or ending a little way above it.

Allied to *A. melleus*, but tougher, quite smooth, with truly decurrent gills, and a nearly smooth stem. There is a smaller variety in which the gills are more decurrent than in the larger form.

247. *A.* (Armillaria) *dicupellus*, n. s.; umbrinus; pileo carnoso sicco convexo laqueato-incurvo; stipite elongato fistuloso flocculento; annulo superiore amplo supra lineato convexo subtus cupulæformi; lamellis distantibus lineatim decurrentibus. Hook. fil., No. 90, cum ic.

Hab. On dead wood. Darjeeling, 7,500 feet. Common. June.

Inodorous, rather tough and leathery. Pileus 2 inches broad, convex, arched and incurved, dry, smooth, fleshy, dark umber, edge slightly striate. Stem several inches high, about $\frac{1}{2}$ an inch thick, nearly equal, umber with a red tinge, very dark at the base, flocculose, squamulose above, hollow to the apex. Ring near the top very broad, reflexed, convex above, and striated from the impression of the gills. Gills umber, distant, connected by veins moderately broad, running down to the ring by a narrow line.

Allied to *A. melleus* and *A. mucidus*, but exhibiting, with two or three allied species, a distinct type. The substance approaches that of *Lentinus* or *Panus*.

248. *A.* (Armillaria) *duplicatus*, n. s.; fasciculatus; pileo plano sicco glabro, margine incurvo; stipite elongato sursum fibrilloso squamoso solido, apice farcto; lamellis angustis postice rotundatis dente ad velum duplex lineatim decurrentibus. Hook. fil., No. 113, cum ic.

HAB. On dead wood. Darjeeling, 7,500 feet. August.

Forming immense tufts, inodorous, firm, dry, leathery. Pilei about 2 inches across, cream-coloured, plane, smooth, with the margin strongly arched and incurved. Substance tolerably thick, tinged with red. Stems 4 inches or more high, $\frac{1}{4}$ of an inch thick, brownish and smooth below, pale and fribrilloso-squamose above, solid, stuffed, or even hollow beyond the double deflexed pink veil, of which the exterior portion is shorter; the interior broad and striate from the impression of the gills. Gills rather narrow, pallid, entire, not ventricose, rounded behind, and then running down to the veil by a very narrow tooth; portion of hymenium between the ring and the broader portion of the gills pale red.

A very remarkable and distinct species, making even a closer approach to *Lentinus* than its immediate allies.

249. *A.* (Armillaria) *multicolorus*, n. s.; pileo plano umbonato carneo-fusco undulato sicco rimoso, margine striato; stipite solido multicolori-variegato; annulo reflexo; lamellis angustis flavo-carneis integris lineatim decurrentibus. Hook. fil., No. 110, cum ic.

HAB. On dead wood. Jillapahar, 7,500 feet. August and September. Rare.

Inodorous. Pileus 4–5 inches across, plane, with a strong umbo and arched but not inflected margin, undulated, dry, shaded with yellow, brown, and red, cracked and showing the white substance; border striate. Stem several inches high, $\frac{1}{3}$–$\frac{1}{2}$ an inch thick, solid, white within, ascending, smooth, flexuous, brown, with yellow and blue shades; furnished above with a white reflected ring. Gills narrow, entire, linear, suddenly contracted and running down to the ring, yellowish rose-colour.

A very singular species, remarkable for its various colours, reminding one of *A. polychrous* and *A. Harmoge.*

250. *A.* (Armillaria) *omnituens*, n. s.; pileo umbilicato tenui expanso carnoso centro floccoso-verrucoso, margine striato glabro; stipite solido brevi obscuro glabro; annulo patente; lamellis pallido-carneis decurrentibus. Hook. fil., No. 46, cum ic.

HAB. On dead wood. Darjeeling, 8,500 feet. May.

Inodorous. Pileus 2 inches across, umbilicate, rather fleshy but thin, dry, pinkish grey, clothed in the centre with minute irregular floccose warts; margin smooth, striate. Stem 1 inch or more high, 1 line or more in diameter, red-brown, smooth, solid, firm, furnished at the top with a spreading narrow ring. Gills pale pink, moderately broad, running down as far as the ring.

This is placed in *Armillaria* on account of the ring, but it has affinities with several species of other tribes, and approaches in some respects the *Lentini*. The name is intended to indicate its multiform affinities.

251. *A.* (Armillaria) *adelphus*, n. s.; pileo carnoso subhemisphærico profunde umbilicato centro flocculento squamuloso margine arcuato striato glabro; stipite elongato farcto; annulo remoto patente; lamellis pallido-carneis longe decurrentibus. Hook. fil., No. 47, cum ic.

Hab. On dead wood. Darjeeling, 7–8,000 feet. May.

Pileus 1 inch across, subhemispherical, carnose, deeply umbilicate, grey, clothed in the centre with flocculent scales; margin smooth, much arched, striate. Stem 2 inches or more high, 1 line thick, red-brown, smooth. Ring narrow, patent. Gills pinkish, much arched, running down to the remote ring.

Very closely allied to the last, but differing in the form of the pileus, the elongated slender stem, arched, very decurrent gills, and remote ring. The pileus, also, is less distinctly warty.

252. *A.* (Tricholoma) *cremoriceps*, n. s.; pileo plano carnoso umbonato opaco glabro; stipite incurvo subæquali obscuriore cavo firmissimo; lamellis distantibus latiusculis postice rotundatis adnatis. Hook. fil., No. 123, cum ic.

Hab. On trunks of trees. Darjeeling, 7,500 feet. September.

Inodorous, subfasciculate. Pileus 3 inches or more across, plane or even depressed, minutely umbonate, dry, smooth, opake, of a beautiful cream-colour; margin crenate; flesh darker, firm. Stem 2½ inches high, ⅓ of an inch thick, nearly equal, except at the base, where it is slightly swollen, much darker than the pileus without and within, very firm, composed of fibres, hollow. Gills distant, rather thick, rounded behind, adnate, with sometimes a very narrow descending tooth, white, with a pale tinge of cream-colour.

The gills in the dry specimens are covered with sparkling granules, which appear to belong to some mould. They are nearly globose, and are far larger than the spores of Agarics. They occur in some other species of the collection, sometimes forming a thick stratum. The beautiful Agaric before us is allied to *A. inamœnus*, but it does not appear to be the least silky or pubescent.

253. *A.* (Clitocybe) *incongruus*, n. s.; pileo undulato umbilicato subcarnoso glabro cinereo-cæsio; stipite elongato basi incrassato valido concolore deorsum cavo; lamellis latiusculis ventricosis decurrentibus. Hook. fil., No. 103, cum ic.

Hab. On the ground. Jillapahar, Darjeeling, 7,500 feet. August, September.

Inodorous. Pileus 1¼ inch broad, undulated, umbilicate, smooth, dry, cinereous-blue, slightly fleshy; flesh white. Stem 6 inches high, nearly ½ an inch thick, incrassated downwards and slightly downy, of the same colour as the pileus, somewhat fibrillose, hollow from the middle to the base, white within except near the surface, composed of fibres. Gills ventricose, rather distant, decurrent, white.

A very curious species, resembling somewhat the amethyst form of *A. laccatus*, and perhaps as nearly allied to that species as to any described. It contracts extremely in drying.

254. *A.* (Collybia) *napipes*, Hook. fil. MSS.; pileo irregulari undulato subdepresso corrugato sicco subcarnoso, margine striato; stipite torto farcto bulboso radicato; lamellis latis candidis postice rotundatis adnexis. Hook. fil., No. 102, cum ic.

Hab. On the ground. Darjeeling, 7,500 feet. July and August. Rare.

Inodorous, rather firm. Pileus 5 inches or more broad, undulated, somewhat depressed, much corrugated, dry, yellowish brown, slightly fleshy; margin sulcato-striate. Stem 4 inches high, 1 inch thick, very much and generally abruptly swollen at the base, twisted, and frequently splitting, fibrous within, with a cartilaginous bark, brown, minutely scaly, sending down a long waved root, at length more or less hollow within. Gills broad and thick, pure white, rounded behind and annexed, distant, sometimes buff when dry. Spores white or buff when dry, broadly but obliquely ovate, large, with a large nucleus.

A splendid species, resembling *A. eurrhizus*, Berk., but differing in the absence of the strong umbo, the want of a ring, and other characters. It is in fact more nearly allied to *A. radicatus*, and especially to what I have called var. *superbiens*.

255. *A.* (Collybia) *raphanipes*, n. s.; pileo rugoso depresso carnoso sicco; stipite deorsum incrassato radicato flocculoso-squamuloso cavo; lamellis latis albis adnatis. Hook. fil., No. 96, cum ic.

Hab. On the ground. Jillapahar, 7,000 feet. June, July.

Inodorous, fleshy, brittle. Pileus 4 inches across, dry, somewhat shining, wrinkled and grooved, olive-brown, plane or slightly depressed; flesh reddish-brown beneath the cuticle. Stem 5 inches high, $\frac{1}{3}$ of an inch thick in the centre, swollen below, then tapering into the elongated root, hollow, red-brown below, white above, clothed with minute flocculent scales. Gills broad, distant, rounded behind, adnate.

This differs principally from *A. radicatus* in its hollow stem, which is fusiform below; the pileus, also, appears to be drier. They are evidently very closely-allied species, though sufficiently distinct.

256. *A.* (Collybia) *stillaticius*, n. s.; pileo e convexo plano expanso glabro stillante viscoso, margine crenato inciso; stipite firmo cavo adscendente libet flexuoso rufo-picto; lamellis crassis distantibus flavo-albis adnexis. Hook. fil., No. 38, cum ic.

Hab. On trunks of dead and living trees. Jillapahar, 8,000 feet. May, June.

Inodorous. Pileus 2–4 inches across, at first convex, then plane and expanded, with occasionally a broad umbo, smooth, dripping with a viscid cream-like fluid, fleshy, pale olive; margin thin, crenate and split. Stem 3–4 inches high, 2–3 lines thick, firm, ascending or flexuous, reddish-brown, hollow, sometimes rooting, springing abruptly from the matrix, equal or subfusiform. Gills distant, ventricose, fleshy, subcrenate, adnexed, or in depressed specimens spuriously decurrent, yellow-white, connected by veins.

Allied to *A. radicatus*, but differing in habit, in its dripping pileus, its crenate incised margin, and ascending or flexuous hollow stem.

257. *A.* (Collybia) *undabundus*, n. s.; pileo subhemisphærico obtusissime umbonato viscosissimo sulcato rugosoque; carne brunnea; stipite elongato furfuraceo cavo; lamellis latis undulatis postice rotundato-truncatis adnexis. Hook. fil., No. 77, cum ic.

Hab. On old timber in woods. Darjeeling, 7,500 feet. June, July. Rare.

Inodorous, erect, very handsome. Pileus $2\frac{1}{2}$ inches or more across, pale brown, hemispherical, with a broad, very obtuse umbo, very viscid, sulcate and wrinkled, fleshy; flesh brown like the pileus. Stem 6 inches high, $\frac{1}{2}$ an inch thick, attenuated at the very base and slightly rooting, striate above, shaded with pale brown, furfuraceous, hollow. Gills broad, white, undulated and loosely crenate, rounded behind, adnexed, distant.

Very nearly allied to *A. radicatus*, but a softer species, with a regularly sulcate pileus, decidedly hollow stem, dark flesh, and abruptly rounded gills.

258. *A.* (Collybia) *triplicatus*, Hook. fil.; pileo campanulato umbonato ab umbone lævi profunde sulcato nitido sicco, margine tenui involuto; stipite elato squarruloso solido; lamellis paucis distantibus remotis. Hook. fil., No. 88, cum ic.

Inodorous, delicate, soft. Pileus nearly 6 inches broad, campanulate, obtusely umbonate, dry, shining, deeply and regularly sulcate, with the exception of the umbo, with fainter and shorter furrows in the intervals, answering to the shorter gills; fleshy in the centre; pale yellow-brown; border almost membranaceous; margin involute. Stem several inches high, nearly $\frac{1}{3}$ of an inch thick, of the same colour as the pileus, rough with short squarrulose flocci, solid, sunk into the umbo. Gills few, distant, pallid, quite free, remote.

A splendid species, combining the characters of *A. radicatus* and *A. longipes*, with the habit of *Heliomyces*. No particular locality is indicated in Dr. Hooker's notes, and the base of the stem appears not to have been observed. I have no doubt, however, that there was a root, as in *A. radicatus*.

259. *A.* (Collybia) *papaveraceus*, n. s.; pileo e campanulato irregulari flexuoso demum depresso tenui toto corrugato; stipite elongato radicato fistuloso reticulato-striato; lamellis angustis crispatis ramosis venoso-connexis carneo-griseis. Hook. fil., No. 86, cum ic.

Hab. On dead sticks amongst moss. Darjeeling, 7,500 feet. June.

Smell very slight. Pileus 3 inches across, brittle but rather firm, dry, glossy, reticulato-rugose, thin, at first campanulate, then expanded, uneven, flexuous and depressed, reddish grey; flesh thin, of the same colour. Stem 5 inches high, $\frac{1}{4}$ of an inch or more thick, rooting and attached by many fibres, fistulose, reticulato-striate or sulcate, darker than the pileus, slightly fibrillose. Gills narrow, moderately close, pinkish grey, crenate and crisped, branched, connected by strong veins, adnexed.

A very curious species, allied to *A. radicatus*, but most distinct. The name alludes to the crumpled aspect of the pileus, as "crumpled as a poppy from the sheath."

260. *A.* (Collybia) *podagrosus*, n. s.; pileo convexo carnoso fortiter incurvato glabro rufo-carneo; stipite valido ventricoso fibrilloso-striato

solido, lamellisque angustis distantibus decurrentibus incarnatis. Hook. fil., No. 134, cum ic.

HAB. On clay banks. Sinchul, 8,000 feet. October.

Inodorous, firm. Pileus 1 inch or more broad, convex, strongly incurved and involute, smooth, fleshy, of a bright reddish brown or flesh-colour. Stem 3 inches high, $\frac{3}{4}$ of an inch thick, ventricose, of the same colour as the pileus, streaked, fibrilloso-striate, solid. Gills distant, narrow, shortly decurrent, paler than the pileus.

Very nearly allied to *A. œdematopus*, but differing in its smooth pileus and distant gills.

* *A. velutipes*, Curt. Hook. fil., No. 23, cum ic.

HAB. On dead wood. Darjeeling, 7–8,000 feet. May.

(*To be continued.*)

Note on MICROCACHRYS, *Hook. fil., and on a new allied genus of* CONIFERÆ *of Van Diemen's Land; by* WILLIAM ARCHER, JUN., ESQ.

(*Communicated by* DR. LINDLEY.)

I. MICROCACHRYS, *Hook. fil.*

Flores dioici. MASC. *Amenta* ovata; *Squamæ antheriferæ* rhombeo-ovatæ, unguiculatæ, peltatæ. *Antherarum thecæ* 2, globosæ, squamis suis valde majores, divaricatæ. *Pollen* trigonum, trinucleatum. FŒM. *Amenta* simplicissima, erecta, vix folia extrema supereminentia. *Squamæ* 4, semi-rotundæ, cruciatim oppositæ, conniventes. *Ovula* 4, amenti ad angulos interiores posita. *Strobilus* minimus, e squamis triangulari-ovatis inæqualibus erectis formatus. *Semina* (2 generaliter perfecta) subfusiformia, nudissima, squamis sublatiora; *testa* papyracea, triptera.—Arbuscula, 10 *ad* 20 *ped. alta, facie subsimilis* Cupresso. Rami *ramulosissimi.* Ramuli *plurimi, tetragoni, sub* 1 *lin. lati, subdistichi.* Folia *rhombeo-ovata, versus apicem inflexa, obtusa, dorso obtusangulosa, cruciatim opposita, ramo appressa.* Amenta *ad apices ramulorum plurima.*

M. tetragona. Hook. fil., in Lond. Journ. Bot., vol. iv. p. 150 (*descr. plantæ fœm. excl.*).

OBS. The female amenta, described by Dr. J. D. Hooker as belonging to this plant, appertain to a hitherto undescribed genus, for which I have proposed the name of *Pherosphæra*.

II. PHEROSPHÆRA, *Archer*. Gen. nov.

Flores dioici. MASC. *Amenta* oblongo-cylindracea, vix ramulis suis latiora. *Squamæ* antheriferæ rotundo-ovatæ, minute ciliato-dentatæ, unguiculatæ. *Antherarum thecæ* 2, globosæ, squamis suis minores, membranaceæ, divaricatæ. *Pollen* . . . . FŒM. *Amenta* ovata, suberecta, ramulis suis dimidio latiora. *Squamæ* oblongo-ovatæ, concavæ, subnaviculares, ad apicem incurvæ, peltatæ, imbricatæ. *Ovula* globosa, solitaria, juxta apicem squamarum posita, super costam sedentia. *Strobilus* minusculus, decurvus, e squamis (circiter 12) foliis submajoribus læviter patentibus formatus. *Semina* minima, ovato-globosa, omnino nuda, solitaria; *testa* chartaceo-spongiosa, lævis, substriata. — Fruticulus *prostratus, humifusus.* Rami *ramulosissimi.* Ramuli *plurimi, tetragoni, sub* 1 *lin. lati, patentes, subdistichi.* Folia *rhombeo-ovata, dorso obtusangulosa, cruciatim opposita, arcte imbricata, ramo appressa.* Amenta *ad apices ramulorum plurima.*

P. Hookeriana (nobis).

Microcachrys tetragona. *Hook. Lond. Journ. Bot.* (quoad amenta fœm. solummodo.)

OBS. In Dr. J. D. Hooker's description of the genus *Microcachrys*, in 'Lond. Journ. Bot.,' vol. iv., he has appropriated to it the female amenta of this hitherto undefined genus, for which I now propose the name of *Pherosphæra* (derived from φέρω, *I bear*, σφαῖρα, *a globe*), on account of its globose seeds.

Extracts from the private Letters of Dr. J. D. HOOKER, *written during a Botanical Mission to* INDIA.

DARJEELING TO TONGLO.

(*Continued from p.* 23.)

At daylight the following morning the temperature was 67°, the sky partially clear, with heavy clouds on the mountains, and especially on the Darjeeling spur, where the village seemed as if lifted up into the air. Descended a very steep gully, choked with *Calami* and *Fici*, and ascended again to the base of Tonglo by a steep slope, cultivated here and there with *Maize*, *Rice*, and *Millet*, and occasionally *Amaranthus*, *Fennel*, *Cumin*, *Capsicum*, *Yam*, *Brindjal* (*Egg-Solanum*), *Cannabis*, and *Buck-*

wheat of two species. The white-flowered *Rue* seems to escape into the fields: it is certainly wild at an elevation of 4–9,000 feet, and is used commonly for all diseases of fowls (mixed with their food, as in England). Before leaving the base of the hills, the men cut the large bamboos for water-vessels (Choongis) to carry up the hill, none of the species found above this level being suited to that purpose.

The ascent continues through dense jungle of *Myrsine*, *Embelia*, *Cedrela*, *Gordonia*, *Aquilaria*, and such tropical trees as I mentioned in the ascent from Punkabarrie to Kursiong.

At noon we arrived at the Lama's residence of Simonbong. It is one of the smallest and poorest Gumpas (or monasteries) in Sikkim.* Unlike the better class, it is built of wooden beams only, and consists of a single large room, raised on a stone foundation, roofed with shingles, and with small sliding shutter-windows. The temple is placed, as usual, on a narrow ridge or spur of the mountain, elevated about 4,000 feet: near it I observed one or two Lamas' tombs, called Chaity,—they are cubes of stone-work, raised on a little terrace, about six feet square, surmounted by a hemisphere, which again is topped with a cone and ball. The devout of my party walked round each several times, always from right to left, repeating the "Om mani Padmi hom," which was inscribed on a slab of slate, let into one face of the tomb. Lamas' bodies are generally burned, on this side of the snowy range; while in Thibet they are exposed to the fowls of the air, or cut to pieces and distributed. Those of the Lamas on the banks of Lake Yarou are said to be always exposed, and the kites summoned by beating of gongs and blowing a trumpet made of a human thigh-bone. That bodies are exposed, and that the thigh-bone of a man is used for a horn, is true enough; but the birds probably accept other signals, less equivocal to their keen senses of sight and scent.

At Simonbong (where we halted) the flora of the temperate regions commences. Two species of *Bamboo* (neither being the alpine) replace the large kind, left below. *Wild Strawberry*, *Violet*, *Lysimachia*, *Geranium*, *Polygonum*, and several *Rubi*, especially the yellow-fruited one (on which we luxuriated), announce the lower level of the second or temperate region, of which Darjeeling may be considered the central point. *Potatos* and *Peaches* were cultivated abundantly, the latter forming little groves, but the fruit never ripens on these hills, from the want of sun.

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* There are upwards of twenty Lama establishments in Sikkim, containing 800 monks. Many are of excellent masonry, Chinese in architecture, gorgeously decorated, and, for so poor a country, richly endowed. During my more recent travels in Sikkim I have visited many, and been an inmate in the monasteries, and met with the greatest kindness and hospitality from the good fathers. As I was the first European who ever lived with the monks, this courtesy was the less to be expected. Dr. Campbell, who afterwards joined me, and in whose delightful society I visited other Lama establishments, records the same opinion of these good-humoured people.

It is curious that in this region of the Himalaya, and from Eastern Nepal eastward, along the whole Himalaya, there is absolutely no good fruit, except *Wallnuts*. Even the English cultivated fruits at Darjeeling are very poor. *Apples* scarcely ever ripen; *Pears* never; *Peaches* never: *Currants* and *Gooseberries* have not had a fair trial, but they seem disinclined to flourish. *Strawberries* grow exceedingly well, but the fruit is very flavourless, much more so than those of the plains, which, though inferior to the English, are still large and fairly good.

European vegetables, again, thrive remarkably, but are all deficient in flavour, however abundant the crop and fair the produce may be to look upon. All are good, but not when compared with English, as to taste. *Potatos* improve wonderfully, and the Darjeeling root, cultivated on the plains, is, I think, superior to the parent stock in size and mealiness.

Mangos and *Bananas* are the only Indian cultivated fruits I have seen, and both are exceedingly bad. The *Orange* from the Teesta river is highly esteemed; and excellent specimens of this fruit are brought up from the plains, though always somewhat the worse for the journey. Of course, neither *Olive*, *Fig*, *Vine*, *Pomegranate*, nor any southern European fruit, grows here: the *Physalis* ("Cape Gooseberry," or "Tippare") does, however: it is a plant indifferent to want of sun and a cool summer, but impatient of a severe winter.

The total absence of sunlight and heat, during the summer of this region, is the cause of this dearth of fruits. The winter of the plains, being more analogous to our English summer as regards the amount of heat and cold, such fruits as the *Peach*, *Vine*, and even *Plum*, can perfect their fruit in April and May, if they only be coaxed through the previous hot and wet season; which, though lasting from June to September, is, to all intents and purposes, their winter. At 7,000 feet on the Himalaya, where the mean temperature is far better suited to their habits, its influence is so modified by the rains and lack of sun during summer and by the cold in the winter, that they stand no chance of fruiting. In short, some English fruits will be content to turn the winter solstice (November to May) of the plains of India into an English summer, and then produce their flower and fruit;—but neither these, nor others, will put up with the accumulated evils of a winter like that of England* (as concerns its effects on European vegetation), and a summer more rainy than that of the plains,—for such are the two solstices of Darjeeling.

The difference between this climate and that of the north-western Himalaya, at equal elevations, several degrees further north and west, is herein very great. There the winters are much colder and more comfortless to the English visiter; the summer is far hotter and less rainy (but afflicted with dust-winds in May). The rainy season is so much shorter, and the sun so much more frequently shines through the more brief but heavier showers, that the apple and many other fruits are brought to far greater perfection than here. Still further north-west, and beyond the influence of the periodical rains (which deluge the south-eastern Himalaya, and gradually are exhausted, being carried north-west by the south-eastern monsoon), the European fruits are celebrated as the finest in the world. Whether the *Grapes, Apples, Melons*, &c., of Caubul, Turkistan, Cashmere, &c., are really equal to the English, or not, I am without the means of judging: those who affirm this most positively are Indian residents, who have left England when young and have sojourned long in the plains, where Pomona's gifts are scarcer and poorer than in any tropical country I have ever visited.† The opinion of the travellers in these countries, who have left England later in life, with their tastes more matured and recent, is, that though the oriental fruits are greater in abundance, and excellent in flavour, they are not comparable to the better varieties of the same cultivated in England, the north of France, Belgium, and Holland. In the valley of Nepal, at Cattmandu, above 4,000 feet, and in the heart of the Sub-Himalaya, Hodgson tells me *Apples* ripen exceedingly well; and so do two varieties of the European *Fig*. The mean temperature is considerably above that of this place, and, of course, the winter is much warmer, snow being hardly ever seen, and never lying on the ground. There the *Plantain* and *Mango* do not ripen, nor the *Orange* always, nor do the *Gooseberry*, *Currant*, or *Raspberry* mature their fruit well; and it is much too rainy for the *Vine*. *Apricots* can be produced with care and are good, but hardly *Peaches*.

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* I do not mean that the Darjeeling winter is to be compared for cold or discomfort to that season in England; but as far as being a winter to English fruit-trees, its specific action on the plant is the same.

† This is not stated unadvisedly nor without wide experience. The excellence of the *Mango* I do not deny, nor of one or two of the varieties of *Plantain*; but these particular sorts are scarce, comparatively speaking; they have short seasons, and so have the good oranges. No one who has walked through the fruit-market of a tropical American town, or a western African, and seen their glorious perennial profusion, of not only species, but varieties of fruit, will for a moment compare the Indian Bazaar to these. So say all who have frequented both.

From this you see that the distribution of temperature is even of more consequence in India than its mean amount, and that a still more influential disturbing cause is the rainy season, whose effect is not only an excess of moisture, but an interception of the sun's rays. In Thibet, north of the Himalaya snows, the *Apple*, *Peach*, *Apricot*, and other fruits, are perfect at elevations from 8 to 10 or 11,000 feet; above which come crops of *Barley*, *Wheat*, *Peas*, *Fagopyrum*, and in places too cold for these, *Turneps* and *Radishes* are the staple crops; above whose superior limit (15,000 feet), either barren stony mountains or grassy plains prevail.

Owing to the comparatively level surface of the Thibetan plain, these crops are characteristic of what cultivation there is at such elevations. The same crops reach nearly 10–13,000 feet, south of the snowy range, amongst the rugged valleys of the Sub-Himalaya; but cultivation is scattered, and only such sites are selected as, though of equal elevation, enjoy a greater temperature during the short season adapted to their growth. Thus, in Bhootan, the limits of wheat are 3,020 to 9,640 feet; between which levels it is the winter-crop, and is reaped in March. On the plains of India wheat is very abundant, and is also a winter-crop. The damp atmosphere, heat, and moisture are as direct obstacles to its being a summer-crop on the plains, as is the winter's cold to its being a winter one at above 9,500 feet on this side the Himalaya, nor anywhere in Thibet.

Radishes, *Peas*, *Beans*, and *Buckwheat*, which are the upper level summer crops of Thibet, are, on this side the snow, the winter-crops of 5–8,000 feet (below *Wheat*, *Barley*, &c.), the heavy rains of the Cis-Himalayan region, and total absence of sun, combined with the cold of 9 and 10,000 feet, being very prejudicial; and they form a strange contrast to the dry atmosphere, powerful sun, and heat of its direct rays in Thibet,—which last makes up for the want of a higher mean temperature.

To conclude this subject,—the same dry summer heat, combined with the intense winter's cold and nocturnal radiation under a clear sky, are equally fatal to the rich, succulent, herbaceous, and arboreous native vegetation of the Cis-Himalayan mountains, as the extraordinary uniformity with respect to solstitial temperature and humidity in the latter region are to a perennial exuberance of vegetable life, and to the ascent of tropical plants to elevations far above those heights which we should consider their superior limit, did we argue from the influence of mean temperature alone.

On ascending Tonglo, we left cultivation and groves of poor *Peach-trees* on its flanks at Simonbong, altitude about 4,000 feet, the average level to which agriculture reaches in a great part of Sikkim. This is a remarkable contrast to either the north-western Himalaya, or to Bhootan, in both of which countries crops are raised abundantly at 6,000 to 8,000, and even to 10,000 feet and upwards; and it is owing to many local causes; some of which, as that the Lepchas prefer dwelling at about that elevation, and the restless life they lead, are obvious; while others, drawn from natural peculiarities, are of extreme complexity.

Sikkim I have always held to be a peculiar nook of the Himalaya, differing much in some of its features from either Nepal in the west or Bhootan in the east; and I am hardly adequately prepared to point out all the prominent features. 1. As a segment of the Himalaya, it is narrower than the average; the snowy mountains of its northern boundary are nearer the plains of India than those of Bhootan and Nepal are, although their peaks attain a higher elevation than any known Asiatic or other mountains in the world. 2. It is cut off from Bhootan by a long meridional snowy ridge with peaks 17,000 feet, running thirty miles south from the main range, a very rare if not unique phenomenon in the Himalaya. 3. Transverse ranges also divide it from Nepal, striking north from Tonglo to the snow, and averaging 12,000 feet in height. 4. A longitudinal ridge (Sinchul mountain, on a northern spur of which Darjeeling stands) separates it from the plains of India. 5. Innumerable ridges, without any arrangement, all reaching 7 to 12,000 feet, are enclosed within these four walls; themselves are intersected by profound ravines, and forest-clad up to and over their summits. 6. What we know of the geology of the country is, that it is remarkably uniform, of crumbling gneiss and mica-schist hills, much more continuously wooded than those of Bhootan, where dry and barren hills of mountain Limestone occur, and where are also broad valleys, equally unknown in Sikkim. 7. By a reference to the map you will see that the rainy wind, the south-eastern monsoon from the Arracan coast, in its progress north-west, first strikes the Cossiah (Khasyah) hills, which it deluges with a vastly greater amount of rain than falls on any other part of India: the rest is expended in Sikkim, and then striking the Himalaya, is deflected west, and becomes comparatively a drier and drier wind (though always rainy) till it reaches the extreme north-western Himalaya.

Sikkim is therefore more rainy* than Bhootan and Nepal, or at least more humid. Encircled by hills, it is sheltered from other winds; and the superabundant moisture is not carried off in vapour by the sun, but clogs the valleys and is again deposited at night, equally intercepting the solar rays and nocturnal radiation, diminishing, in short, the day's heat and night's cold, and producing a climate, which, all the world over, in the western Highlands and Wales near home, or on the remote shores of South Chili and Fuegia, is eminently prejudicial to cultivation, whether of grains or fruits. It, moreover, causes the dispersion of the human population:—for few parts of a country, so uniform in features, are more favoured than the rest; warmth and comparative dryness are sought in the narrow valleys and their southern exposed slopes, above which the heated vapours are raised by the morning sun, to be condensed on the cooler mountain forests, whose murky atmosphere and dark dripping vegetation the poor Lepcha peoples with the bad spirits of his demonology.

I do not think that the similarity of these features in the Himalaya of Sikkim with those of the other far-distant countries mentioned, and their mutual effect upon organized life in both, exists in my own fancy: it is further traceable in the native vegetation, and is eminently conspicuous in the paucity of animal life, especially quadrupeds and birds. My attention was irresistibly called to the subject before I had ascended 6,000 feet on my road to Darjeeling; and to the present hour I am more struck by this fact than by the many grander and more novel phenomena which these mountains present. I am everywhere reminded of the damp west coast of Tasmania, of the New Zealand Islands, of the humid portion of extra-tropical South America, of the Hebridean Islands, the north-western coast of Scotland, and some parts of Wales. A scattered population, rude cultivation, a damp atmosphere and dripping sky,—no summer's warmth nor winter's cold,—no genial ray of spring, no Dog-star nor summer's sun, no harvest-moon, crisp frost, or sparkling Christmas. The ground never chirps beneath the tread: the falling leaves decay, and do not rustle under foot. All animate nature is deadened: the forests are quiet, or the few birds that cry utter a mournful note. Magnificent as is the vegetation, exuberant in species, rich in colouring, profuse in the rarest and most delicate forms, of temperate and tropical climes combined, these productions are not the children of a joyous spring, or if of spring at all, surely the illegitimate progeny of a churlish season:—they are smuggled into existence unacknowledged by blue sky and bright sun, heralded by no birds, cropped by no beasts: they bud, and flower, and fruit, heedless of the dashing rain and oppressing fogs.

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* The mean fall probably does not exceed 100 inches, as measured by the pluviometer, an instrument which takes little or no account of the enormous deposition in the shape of mists and fogs.

Pray do not think I am unfairly depreciating the climate of Darjeeling, which is admirably adapted to the English constitution. I am only comparing it with more favoured spots, *inaccessible* to the European invalide. Its effect on the debilitated frame is marvellous,—really incredible; and if there is truth in children's faces (and where else, if not?) it is undeniably well suited to them too. Its proximity to Calcutta, accessibility at all seasons, the narrowness of the Terai belt, coolness of climate, abundance of vegetables, and great capabilities for further improvement (rapidly as it has progressed), will, no doubt, render it the most crowded of the hill-stations, as it is the only one to which the majority of the Bengal residents can resort, for that short month which may be granted for the re-establishment of health. The great expense of Dawk-travelling, and the tedious length of a water-passage (the only alternative), to reach the foot of the hills, are the chief objections to Darjeeling;—by the first, the journey (300 miles) cannot be performed under 30*l.*, but in five days only; by the latter it occupies six weeks, and costs a third of the money. The expense and fatigue of Dawk-travelling I consider one of the greatest evils of India. A country prospers almost in direct proportion to the facility of locomotion therein; and India, with all its justly boasted wealth, splendour, civilization, and appliances, is disgracefully behind Australia and Canada, or even many of the decaying French, Portuguese, and Spanish colonies, in the public means of conveyance, within 300 miles of its capital.

(*To be continued.*)

BOTANICAL INFORMATION.

LINNÆAN SOCIETY.

The 4th of December, 1849, will ever be memorable in the annals of the Linnæan Society, from the honour it was enabled to confer on itself by the election of Mr. Brown to the Presidency. It should, however, be generally known, for the sake of those members who have taken an active interest in the welfare of the Society, that the election of this eminent man has been an object of their frequent solicitude for the last twenty years ; but the unwillingness of Mr. Brown to accede to the wishes of his friends in 1828, when Lord Stanley (the present Earl of Derby) was elected as the successor of Sir James Edward Smith, and at the subsequent elections of the Duke of Somerset and of the late excellent Bishop of Norwich, could not be overcome, though no members of the Society more strongly urged the claims which the Society had upon Mr. Brown, than these distinguished men.

To those who know Mr. Brown, this reluctance on his part to accept of the distinction implied by the late election, is felt to be consonant with their estimate of his character ; for the modesty which invariably attends the highest intellectual attainments was never more conspicuous than in this great botanist. But whatever tribute is due to the extraordinary sagacity and learning of Mr. Brown, those who are privileged with his intimacy feel that the singular simplicity, the sterling integrity, and the affectionate solicitude and tenderness of his nature, task their regard for him quite as much as his high scientific attainments command their respect and confidence ; and we rejoice that a Society endeared to us by its objects, and by the association of many whom we have loved and lost, and of others who survive to sympathize with us in our love of plants, is under the care of one so eminently calculated to promote its prosperity.

Mr. Brown took the chair at the meeting of the Society on December the 18th ; and the interest excited by the event was shown by the presence of many who do not ordinarily attend its meetings. He briefly acknowledged the compliment that had been paid to him by the Society, and made a just and due acknowledgment of the great services rendered to botany by Dr. Wallich, by appointing him one of the Vice-Presidents.

The vacancy in the council has been filled by the election of Dr. Charles Morgan Lemann, one of the most zealous botanists of the day, and one who, ever ready to assist others in their inquiries, is unjust to his own extensive knowledge of plants, by not diffusing it more publicly abroad.

The following classical address, from the Royal Bavarian Botanical Society of Regensburg, in a printed form, with the seal appended, has been presented to Mr. Brown, by Dr. Wallich, who was officially delegated for the occasion, and has a similar address for presentation to the Linnæan Society at their next meeting.

Viro eminentissimo, edoctissimo, emeritissimo,
Domino Domino ROBERTO BROWNIO, D.C.L.,
Permultarum Societatum Literariarum Socio et Patrono,
ET NUPER LINNÆANÆ LONDINENSIS PRÆSIDI ELECTO,
Botanicorum Antistiti,
Qui Antipodum Floram primus et pæne solus digessit,
Explorans fideliter quas et ipse legerat et alii reportarunt plantas,
Qui complures Plantarum Familias Naturales ordine disposuit,
Exquirens fortiter novas et neglectas generum notas,
Qui Physiologiam Stirpium plurimis investigationibus dispunxit,
Exponens feliciter morphoseos et geometrices botanicæ leges,
Qui reliquias Pristinæ Floræ fossiles discretim discussit,
Expandens florenter intimam lignorum structuram,
Qui denique hodiernæ Phytographiæ et Phytologiæ aperto discrimine
Et pater et stator et auctor exstitit,
Et, quod faustum nomen socio imposuit Germanorum Academia distincto,
Ceu alter Raius per totum orbem famam sui dispersit,
Honorem, quo et se ipsam et virum ornavit Societas Linnæana,
Promovendo in sedem patroni divi Linnæi talem vicarium,
SOCIETAS BOTANICA RATISBONENSIS REGIA
Piè gratulatur.

Calendis Januar. MDCCCL.

MR. ZEYHER'S *South African Plants.*

Some of our readers may be glad to know that a few very good sets of plants, varying from 1,200 to 1,300 species in each set, of Southern Africa, collected by Mr. Zeyher, in various parts of the country, extending from Namaqua Land to Macalisberg, are placed in the hands of Mr. Samuel Stevens, Natural History and General Agent, 24, Bloomsbury-street, London, and are offered at little more than half the price recently put upon them by Mr. Zeyher. They are numbered, and the numbers are understood to correspond with a list published in the volume of the "Linnæa" for 1847.

NOTICES OF BOOKS.

Memorials of John Bartram and Humphry Marshall; with notices of their Botanical Contemporaries; by WILLIAM DARLINGTON, M.D., LL.D. Philadelphia. 1849. pp. 585.

We are indebted to our excellent friend Dr. Darlington, of West Chester, Pennsylvania, for a copy of this interesting work,—one quite congenial to the generous nature of the author, who is already known by the affectionate tribute he has paid to the memory of Baldwin, in his 'Reliquiæ Baldwinianæ;' by his 'Flora Cestrica,' one of the best local Floras in the United States; and by his useful work on 'Agricultural Botany.'

The Memorials of Bartram consist of letters, principally from his early patrons in England, among whom the name of the excellent and zealous Collinson stands prominently forward. This correspondence had been entrusted to Dr. Darlington by Colonel Carr, who married Bartram's granddaughter. A few of the "*rough draughts*" of Bartram's letters are given, and it is only to be regretted that the entire letters and *journals* of this remarkable man have not yet been discovered, as they would have added largely to the value of the work. There is enough, however, to impress us with the striking qualities of Bartram's nature. His zeal in the search of plants, especially of the forest-trees and shrubs; the sagacity with which he discriminated them, amid the poverty of his means for self-instruction; the integrity of his dealings; the happiness he found in his pursuits, and the fervent piety consequent on his observation of the works of nature, are conspicuous not only in his own letters, but in those of his friends, who abundantly testify to the respect which his talents and character had inspired.

To those who take the same pleasure that we do in familiar correspondence of this kind, Dr. Darlington's work will rank with that of Sir J. E. Smith, in the correspondence of Linnæus and other naturalists, published in 1821. Dr. D.'s work is of a more local character, but this will only recommend it the more to our American friends.

One fact has affected us painfully, and was quite unexpected to us, from the known simplicity and prudence of Collinson's life. His son, who seems to have inherited his tastes, under date of June the 28th, 1771, alludes to embarrassments which disturbed the happiness of the closing scene of his father's life. In speaking of a balance due to Bartram, which proved larger than was expected, he says:—"The truth is, latterly my dear parent found those things a trouble to him which caused none a few years since. His situation, too, in point of circumstances, was likewise mortifying. His business, at last, totally declined; and you will, Sir, I am sure, from the goodness and humanity of your own heart, and your long and unremitted friendship for him, be shocked when I tell you, that he solicited a small pension for an age near 75, great part of which was employed in pursuits advantageous to his country, and was refused!"

In the Memorials of Bartram, there is a long and interesting letter from a Russian gentleman, Iwan Alexiowitz, which gives a pleasing account of a visit paid to Bartram in 1769. The mutual correspondence of Bartram and Collinson, from 1734 to 1768, the year of Collinson's death, occupies the largest portion of the work. But there are other letters of interest from Sir Hans Sloane, Dillenius, Catesby, Dr. Fothergill, Gronovius, Miller, Clayton, &c. Those of the son of Collinson, and a few from Dr. Franklin to Bartram, showing the friendship between them, are very interesting.

If, however, full justice is ever to be done to the memory of Bartram, it will be by the discovery and publication of his letters and journals, which we think must be preserved by Collinson's descendants. They are spoken of by his son as "*invaluable.*" "Your sentiments," he says to Bartram, "are original, ingenious, and to the last degree pertinent, on the subjects on which they treat. They were held in a manner *sacred* by my dearest father, nor is their consequence sunk in the hands of his son, by whom they are considered as an inestimable treasure of American Natural History."

There is an occasional notice of William Bartram, and some letters addressed to him by his father, by Muhlenberg, Salisbury, Wilson, and Michaux. One, from the celebrated Henry Laurens, gives a painful description of William's forlorn situation on a farm he had taken in

Florida. William was patronized by Dr. Fothergill, especially for his drawings, some of which are still extant, and of great merit, in the Banksian Library; and we feel that some fuller memorial of this favourite son of John Bartram, and the early friend of Wilson, is due to his merits.

Of Marshall, the cousin of John Bartram, less is known; and this record of him, as one of the early observers of American plants, is the more valuable. He was highly respected, and formed a Botanic Garden in 1773. In 1780 he published an 'Arbustum Americanum,' the first publication on the botany of the United States by an American. Schreber in 1791 established the genus *Marshallia* in his honour. He died in 1801. Among his correspondence are letters from Dr. Fothergill, Dr. Franklin, Sir Joseph Banks, &c.

Among the *memorials* of these early pioneers of American Botany, given in this volume, not the least interesting are the representations of the residences of these naturalists (exhibiting a style of building, we apprehend, very different from that of the present day in the United States), and a woodcut of the silver cup presented to Bartram by Hans Sloane, bearing the inscription, "The gift of Dr. Hans Sloane to his friend John Bartram, Anno 1742."

It is fortunate for the history of American botany that Bartram kept copies of so many letters as are here published; were it not for them the Memorial of John Bartram would rather have been a memorial of Peter Collinson. Still, the number here published is small, in proportion to what he must have written; and Dr. Darlington is naturally very anxious to know if such still remain with the representatives of the Collinson family. Some particulars relating to Peter Collinson are given in our friend Dillwyn's very interesting 'Hortus Collinsonianus,' a privately printed brochure; and we know that Mr. Dillwyn has since traced the existence of a mass of papers, supposed to contain the letters of his friends, to the period when the grandson of Peter Collinson occupied "the Chantry," near Ipswich, "where was a room apparently full of old furniture and papers always kept under lock and key by the possessor, who died about ten or twelve years ago." Should this meet the eye of any one able to give information on this head, the Editor will feel grateful to have it communicated to him.

BOTANICAL EXCURSION *on the* AMAZON; *by* R. SPRUCE, ESQ.

[We have noticed the arrival of Mr. Spruce at Parà in a previous number, and have now the pleasure of giving the following more recent particulars.—ED.]

Parà, 7th Oct., 1849.

Before this time I hope you will have received two letters from me. The 'George Glen,' from Liverpool, has been here about a week; and I shall take the opportunity of forwarding several things by her, though, as I start for Santarem the day after to-morrow, I shall have to entrust them to a friend for embarkation. The pressure of preparation prevents me also from writing so much as I could wish; but the accompanying list of vegetable curiosities which I have amassed for your museum, and which fill two cases, will give some idea of what I have done. Along with these cases you will receive a third, containing chiefly *Orchideæ*, but also a few Aroideous and other plants. I send to Mr. Bentham at the same time a case of dried *Vasculares*, of which the first sets will number 300* species, including eighty-three ferns, of which some of the smaller epiphytal ones may possibly be new, and a packet of very interesting lichens to Mr. Babington. I have, besides, a Ward's case full of plants, chiefly Palms, of whose contents I will give a list below;—these I leave in charge of Mr. A. Campbell, who undertakes to have the case fastened up and despatched about March next. These plants have cost me much trouble, and have already performed voyages in an open boat amounting to 110 miles.

When I last wrote to you we were expecting to visit Caripi and Tanaü, which we have since done. Both these places are really on the mainland, though this whole region is so intersected by rivers and igaripés that it may be looked on as a set of islands. Thus, Caripi is constituted an island by the Igaripe-Miri, which communicates at both extremities with the Rio Parà. Its position is on the Bay of Marajó, which, being ten miles wide, quite resembles an inland sea, and is about thirty miles west of Parà. The shore of the river is here a beautiful sandy shelving beach, which we could traverse for many miles at low water, though we were occasionally obliged to strip in order to pass the mouths of the igaripés. I made here a rich harvest among the forest-trees, of which new ones burst into flower every day, and I have no doubt this is the case all the year round, although the rainy season may be, as they say, the best season for them. Near the beach the trees were lower and more branched than the same species in the dense forest, where, besides, it is only such as are fortunate enough to elevate their heads above their fellows that bear flowers and fruit, while on the beach they flower and fruit profusely. The beginning of summer is, however, more especially the season of *flowers*,—the end of summer and the beginning of winter, that of *fruits*. During our stay at Caripi, Mr. Campbell's men were employed in cutting down trees to enlarge the open space around the house, and I gave them instructions to let me know whenever they cut down one in flower. Occasionally, too, I induced them to go a little out of their way to cut down a tree in flower or fruit, and I thus secured good specimens of many interesting trees, including the *Ucú-uba*, or oil-tree (*Myristica sebifera*, Sw.); the *Umiri* (*Humirium*, sp.), whose bark is used as a perfume; the *Muruni* (one of the *Malpighiaceæ*), the bark of which excels oak-bark for tanning, the *Anani*, and many others. My principal excursion from Caripi was to an Indian settlement in the heart of the forest, about five miles from Mr. Campbell's house, where the manufacture of the *Caraipé*, or fire-proof pottery (a branch of art still confined to the Indians), is carried on. Our journey was certainly an extraordinary one:—along hunters' tracks, which none but an Indian could have found, over fallen trees, and occasionally across an igaripé, the only means of crossing being by a single trunk of a tree, which I and my companion were glad to traverse *à cheval*, much to the amusement of our guides, who tripped across with their bare feet in security. After witnessing the process of making the pottery, an old Indian accompanied us about two miles further into the forest, to see the Caraipé-tree growing, and, if possible, to procure specimens of it,—which we succeeded in doing, though unfortunately neither flower nor fruit were visible. I visited, also, the *Mandiocca* grounds of these Indians; and a woman engaged to procure for me cuttings of every variety they cultivated. When these came, she was unable to say to which of the eight varieties each cutting belonged, but she gave me leaves of each variety separately, and I wrote down the names from her mouth: these, she said, would distinguish the varieties when they came into leaf; I have therefore dried them, and send them along with the cuttings, and you must do the best you can to separate the varieties. What they have under the name of *Maniva-macacheira* is a distinct species, the *Manihot Aypi* of Pohl, the root of which is edible when simply boiled. I ate some of it, which these people gave me, and found it excellent, as mealy as a potato, but possessing more substance, and, I believé, far more nourishing.

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* These, as already announced, Mr. Bentham is generously engaged in arranging, and numbering, and distributing to the subscribers.—ED.

The promontories stretching here and there into the bay of Marajó are all rocky, the rocks sometimes ten feet high, consisting partly of the usual reddish-grey sandstone of the country, but principally of large amorphous masses of reddish honey-combed rock, quite resembling the dross of an iron-furnace. These I do not hesitate to pronounce volcanic. I have seen one instance of the contact of the two rocks: the trap had penetrated the clefts of the sandstone and partially fused it. If any of our geological friends would like to see a mass of this rock, I can probably send one when I return to Parà; but I found it too hard to break off a fragment.

At Caripi I visited, also, a deposit of shells at a considerable distance from the river; but I have since obtained better specimens brought from a similar deposit at Salinas, which I send, along with a separate notice.

The old low trees along the beach were filled with Orchideous plants, and other epiphytes, besides several *Loranthaceæ*. Of the *Orchideæ* only one or two of the smaller species were in bloom; but I gathered of all I could find, and now send them, in order that when they flower you may ascertain whether they include any novelties.

After a fortnight's stay, we proceeded directly from Caripi to Tanaü, in a galiota of Mr. Campbell's. The distance is 50 miles, and, in consequence of our men missing the tide, the voyage occupied us from two o'clock in the afternoon of one day until noon of the next. Tanaü is about thirty miles south of Parà, and on a branch of the Rio Parà, called the Rio Acarà. This is, comparatively speaking, *a brook*, being only 800 yards wide; yet it is navigable for the largest vessels at a distance of five days' journey from its mouth, and its actual source is in the province of Maranhaon. The ground at Tanaü offers an agreeable contrast to the unvaried plain about Parà. Immediately behind Mr. Campbell's house, hills rise to the height of 130 feet, and there are loftier ones behind in the forest. Here and there, too, one comes unexpectedly on a ravine filled with palms and ferns. Of the latter I made an interesting collection, including several climbing species, some very minute *Hymenophylleæ*, besides a good number of *Adianta*, &c. The palms at Tanaü are a different set from those at Caripi : they include *Iriartea exorrhiza*, *Euterpe edulis*, *Mauritia armata*, *Œnocarpus Bacaba*, and three or four small palms, among which *Hyospathe elegans* is the most conspicuous, and some others. At Caripi, the magnificent *Muritis* (*Mauritia vinifera* and *flexuosa*), together with *Maximiliana regia*, are the most abundant. The *Muritis* are laden with fruit all the year round, whilst most other palms seem to fruit in the rainy season only. At both Caripi and Tanaü the genera *Desmoncus* and *Bactris* are far too frequent in the thickets to render the traversing of them an agreeable or easy matter. Perhaps in no part of the world are palms seen in greater perfection than in equatorial America. Throughout the year this climate knows no wind sufficiently fierce to tear their fronds, and thus rob them of that exact symmetry which constitutes their greatest beauty. I have seen nothing more striking than a grove of *Muritis*, on the white beach at Caripi, viewed by moonlight, each palm equalling or exceeding 100 feet in height. They recalled the lofty pillars and "high embowered roofs" of the ecclesiastical edifices of my native land.

The preparation for the voyage to Santarem is like furnishing a house. I have had to buy kettles, pans, plates, &c. &c., besides a good stock of provisions for the journey, such as rice, dried fish, &c. We are fortunate in meeting with a fine large brig, belonging to Captain Hislop of Santarem, in which to make the voyage ; and we are now in the best season of the year for ascending the river. The rains, however, for nearly three weeks past, have been tremendous, exceeding anything witnessed in the last rainy season, and such as no one here recollects in the dry season of any year. I am rather glad of them, as they prevent vegetation from being burnt up. The Messrs. Wallace started for Santarem before we went to Caripi ;—I have just heard from them : they were twenty-eight days on the voyage, the last week of which was a perfect martyrdom, from the mosquitoes, which allowed them no rest night or day. This is an awful expenditure of time, during which it is impossible to add to one's collection. The captain of our vessel does not expect to land all the way up.

The voyage to Santarem costs upwards of £10. Mr. Campbell's kind hospitality (for we were living entirely at his expense at Caripi and Tanaü) has enabled me to husband my slender funds; but there have been many expenses since we came here, which have made a visible hole in them, and I shall look anxiously to England for some replenishment of my stock. They made me pay 25*s.* duty on the frames for plant-cases! I appealed to our consul, but there was no redress; and I pay 12*s.* 6*d.* for the completing of each case, besides having to buy screws, putty, &c. I have had to purchase a couple of the hammocks of the country, which cost above £1 each, and there have been numerous other unavoidable expenses. The packing-cases I now send off cost me no little. The largest of the three, resembling a coffin in shape and size, we made ourselves out of the cheapest timber of the country—a rubbishly cedar brought down from the River Solimoes: the wood cost me 7*s.* 4*d.*, and the box contains near a shilling's worth of nails. I was told in Liverpool that I should find everything dear here but food, and that I should have to pay dollars for shillings. This is rather exaggerated: I pay about *milreis* (a milrei is 2*s.* 1*d.*) *for shillings*, as compared with the cost of the same articles in England.

At Caripi I procured, with great trouble and difficulty, two bunches of the fruit of *Mauritia vinifera*, and one of *M. flexuosa*. These were of immense size, and could they have been got to England entire, they would have formed as splendid objects as any in your museum. I was told the fruits would all drop off in drying, but I hoped there might be an exception in this case, and I had them carefully suspended in a shed. By little and little I had the mortification to see all the fruit fall, and I am obliged to content myself with sending you a few loose fruits of each. If you could have the two stems nicely cut at one end, they would be interesting to show the internal structure of palm-stems. The things will require to be carefully taken out of the box: they are carefully packed, but they require also to be gently handled. Few of the palms have the spadices completely clad with fruit, even in their most perfect state; and several fruits usually fall when green.

The fruit now on the trees of the *Castanha* and *Sapucaya* is quite green, but I shall hereafter be able to send you good specimens. The *Masaranduba* flowers and fruits early in winter.

I have written out the list of curiosities in such a way that my original labels can be attached to each article, if this would be any advantage.

Santarem is the largest town on the Amazon, and there is constant communication between it and Parà; hence I have been induced to make it my head-quarters. Mont' Alegre, my proposed botanizing-ground, is at a short distance up an igaripé, on the opposite shore of the Amazon; and no vessels ever touch there.

At Santarem I will religiously perform Dr. Von Martius's commission, relative to the crucifix,* &c.

Since I began this letter, the President of the province has had the kindness to send me nine letters, addressed to the military commandants at various places I propose visiting. For this and other civilities I am indebted to Lord Palmerston's letter to our consul.

The only drawback I feel from the pleasure of proceeding to explore new ground, is, that I go with a poor stock of health. I did not mention that I had an attack of fever (called here a *Constipacoen,* and much dreaded by the people) at Tanaü, which held me a week, and the effects of which I have not yet shaken off. It was caught by being a whole day with wet feet in a palm-swamp. There is no getting plants here without exposing one's self to wettings of every kind, and without being almost devoured by insects. You can scarcely imagine how much I long to be among hills. If I am successful, I shall be in no hurry to descend the river again. When I do return to Parà, I propose spending three or four months among things I am now obliged to leave; and if there are any ferns, &c., in my dried collection you desire to have alive at Kew, I will procure them.†

RICHARD SPRUCE.

Many of the vegetable curiosities above mentioned are so interesting that we subjoin a list of them, as forming a part of the Kew Museum :—

No. 1. *Mauritia flexuosa,* Linn. (*Muriti,* Bras.) (Portion of lower part of stem; fruit; and leaves of a young plant.) From the lands of Archibald Campbell, Esq., at Caripi, on the Bay of Marajó, Rio Parà, S. Am. The palm from which this was cut measured 71½ ft. from the base to the insertion of the leaves; each leaf-stalk was about 13 ft. long, and the blade of each leaf 7½ ft.; the diameter of the trunk 15¾ inches. A bunch of the fruit was a heavy load for two men. One of the lowest trees was selected, for the sake of obtaining the fruit perfect: some of the neighbouring trees must have been at least half as high again.

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* This, we believe, alludes to a request made by Von Martius, that a memento should be placed by Mr. Spruce where that distinguished naturalist had a miraculous escape from some very imminent danger.—ED.

† We may here take leave to mention, that Mr. Bentham has already inspected this collection, which is about to be distributed at the price of £2 per hundred species (all expenses included), and he pronounces the plants to be well selected and in beautiful condition,—many very good things, with several new ones. This gentleman has already named the *Leguminosæ,* among which is the rare *Sommeringia.* There are also beautiful specimens of a fine *Pachira,* of several fine *Rutaceæ* (or allied families), and some very curious-looking small plants, which have not yet been examined.

No. 2. *Mauritia vinifera*, Mart. (*Muriti*, Bras.) (Lower part of stem; fruit; leaves of a young plant.) Marshes at Caripi, Rio Parà, S. Am. Height of trunk to insertion of leaves, 63 ft. Diameter, 16 in. Leaf-stalk, 13 ft. 6 in.; blade of leaf, 7 ft. 5 in. The thin pulp (*vitellus*) of the fruit of this species is edible. The trunk contains a small quantity of sugar. *M. flexuosa* possesses the same properties.

No. 3. *Euterpe edulis*, Mart. (*Assai* or *Assai-zeiro*, Bras.) Marshes near Parà, S. Am. August 1849. (Two spadices and two leaves.) From the very thin pulp of the fruit of this species a grateful beverage is prepared, which is unknown beyond the province of Parà. It is made in this manner:—the recently gathered fruits are put in hot water, and allowed to steep for an hour or two, after which, by a process similar to kneading, the pulp, along with the skin, is separated from the stone, and the whole being shaken in a peculiar kind of sieve (called a *Gurupema*), the pulp passes through, leaving the stones and skins behind. The liquor thus obtained is insipid, but the addition of sugar and farinha brings out a flavour not unlike that of blackberries, which it resembles also in the deep purple colour.

No. 4. Male spadix and spathe of the Tucumá palm (Astrocaryum Tucuma, *Mart.*) Banks of the Rio Parà, S. Am. July 1849.

No. 5. *Bactris Maraja*, Mart. (*Marajà*, Bras.) (3 spadices.) Marshes near Parà, S. Am. July 1849. The ripe fruit of this palm is more agreeable than any other palm-fruit I have tasted.

No. 6. Spadix, leaf, and portion of stem of a small palm in the forest near Parà. August 1849. (Caudex 12–15 ft.)

No. 7. *Maximiliana regia*, Mart. (*Inajá*, Bras.) (Male spadix and spathe.) Caripi, Rio Parà, 1849. The spathe of this species is a ready-made basket, used by the Indians for carrying earth, clay, farinha, &c. It is sometimes three times as large as the specimen sent. The fruit of the *Inajá* is burned by the *Seringueiros, i. e.*, India-rubber makers, for smoking and drying the successive layers of the milk of the Seringue, which they apply to their clay-moulds. A leaf which I measured exceeded 30 ft. in length. The *Inajá* furnishes a more delicious "cabbage" than any other palm.

No. 8. *Hyospathe elegans*, Mart. (*Ubim*, Bras.) (Stem; 2 leaves; upper part of stem, with male and female spadix; 2 fertile and 2 male spadices.) In wet ravines at Tanaü, near the junction of the rivers Acarà and Parà. September 1849. The fronds of this pretty species make the best and neatest thatching for cottages.

No. 9. *Iriartea exorrhiza*, Mart. (*Paxiuba*, Bras.) (Spadix; leaf; portion of stem from near summit; stem of a young plant, with the emersed roots.) Tanaü, on the Rio Acarà, a tributary of the Rio Parà. September 1849. Young stems of this palm are exported in great quantities to the United States, where they are used for umbrella-sticks.

No. 10. Leaf and spadix of a small palm, with red prickly fruit, from Tanaü, on the Rio Acarà, S. Am. September 1849.

No. 11. *Desmoncus* ——— ? (Leaves and inflorescence.) Tanaü, Rio Acarà, S. Am.

No. 12. *Bixa Orellana*, Linn. (*Urucú*, Bras.) Environs of Parà, S. Am., very frequent. July 1849. (Leaves, and fruit laid open to show the seeds, from which is prepared the *Annatto* of commerce).

No. 13. *Humirium* (*Umiri*, Bras.) (Wood, leaves, and fruit.) *Caripi*, on the shores of the Rio Parà, S. Am. August 1849. From the bark of this tree a perfume is extracted which is much esteemed in Brazil. The wood is used in house-carpentry, especially for rafters.

No. 14. (*Anani*, Bras.) (Wood; leaves and flowers; gum secreted by bark.) Caripi, on the Rio Parà. August 1849. A lofty handsome tree, branching only near the summit. The wounded bark exudes abundantly a yellow, viscid, bitter-tasted gum, which changes first red, and then umber, in drying. Plaisters made of it are used by the Indians in chest disorders, and it is also extensively used for caulking canoes.

No. 15. *Myristica sebifera*, Sw. (*Virola sebifèra*, Aubl. *Ucú-uba*, Bras., *i. e.*, *Oil-tree.*) (Leaves and flowers; wood.) Caripi, on the Rio Parà. August 1849. The nuts of this tree furnish the best wax in the province. A watery gum exudes from the bark, which finds a place in the Brazilian *Materia Medica*. The ashes of the wood are used with Andiroba oil for making vegetable soap; as are also the ashes of the *Xiriuba* tree, and of the skin of the fruit of the Cacao.

No. 16. Sieve called a "Gurupema," made by the Indians near Parà, and used chiefly in the manufacture of "Assai." It is made from a plant called *Uarumá*.

No. 17. Sipó, called "*Timbo-titica*," from forests at Tanaü, on the Rio Acarà, near Parà. September 1849. This is considered the toughest and most flexible of all the Sipos, and is extensively used as a substitute for string. (I send the leaves: flowers or fruit I have not yet seen.)

No. 18. *Siphonia elastica*, Pers. (*Seringueira*, Bras.) (Wood; leaves and flowers.) Tanaü, on the Rio Acarà, a confluent of the Rio Parà. September 1849. This tree, which produces the genuine *Caoutchouc*, is one of the largest and handsomest in the forest. When growing in rather open situations, it is branched almost from the very base. The milk is much thinner than that of the Cow-tree, and falls away in drops from any incision that is made in the bark. Much more is yielded by the trunk than by the branches.

No. 19. Leaves and bark of the celebrated "*Caraipé*,"* or pottery-tree, from Caripi on the Rio Parà. August 1849. The *Caraipé* tree is exceedingly straight, slender, and lofty, attaining a height of 100 ft. before it sends forth a branch, and with a diameter at the base not exceeding 12–15 inches. The wood is so hard that our tools would not enter it. In making the Caraipé pottery, the purest clay is preferred, as it takes up the greatest quantity of the bark; this quality of clay is procured from the beds of the rivers and igaripés. The accompanying specimens were made for me by an Indian woman, residing on the Igaripé Castanhal at Tanaü, and consist of nearly equal portions of clay and the powdered bark of the Caraipé. They will bear almost any amount of heat. The two panelas are used for heating milk, boiling eggs, and similar purposes: much larger ones are often made. The smallest utensil is a rough model of a Fogarêiro, or chafing-dish, such as is to be seen in nearly every house in the country; over this the panelas, &c., are heated.

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* *Caraipa angustifolia*, Aubl., in all probability; of which Aublet says, "Les Gueripons emploient les cendres de son écorce, mêlées avec une terre grasse, pour faire leur poterie."

No. 20. Bark, leaves, flowers and fruit of a small tree, called *Muruxi*. Caripi, Rio Parà. August 1849. *Byrsonima*, sp.? The bark contains a large proportion of tannin. It is also used as a dye, and when the Indians marched to the attack of Parà, in the insurrection of 1835, they stained their garments red with the bark of the Muruxi. The fruit is yellow when ripe, and is considered very good eating.

No. 21. *Masseranduba*, Milk-tree, or Cow-tree. (A piece of the wood, with milk flowing from the end; milk, solid and fluid; leaves.) In virgin forests, at Tanaü, Rio Acarà, Parà. September 1849. The milk flows slowly from the wounded bark; its consistency is that of good cream, and its taste perfectly creamy and agreeable, with the exception of a very slight bitterness, derived probably from the outer rind. It is extremely viscid, and it is scarcely possible to get it off the hands or whatever else it touches; this property renders it a rather unsafe article of diet, and serious cases of constipation have resulted from its use by the woodcutters. The timber is excellent for the purposes of ship-building. The frigate Impératriz, built at Parà, of the wood of the Masseranduba, and launched in 1823, is still in excellent condition. (Although I have seen only the leaves of the Masseranduba, I have no hesitation in referring it to the N.O. *Sapotaceæ*. May it not be the very same as the "Bully-tree" of Tobago, which seems to have the same solid and close-grained wood, and whose milk forms an excellent glue?)

No. 22. Tobacco-pipes made by the Indians of Caripi, on the Rio Parà, and extensively used throughout the province; with specimens of the shrub (called *Tacuari*) from the slender branches of which the tubes are made.

No. 23. Shell and leaves of the *Sapucaya* (*Lecythis ollaria*). Caripi, on the Rio Parà. August 1849.

No. 24. Leaves and resin of a tree called "Breô branco" (*i. e.*, white pitch). Caripi, on the Rio Parà. August 1849. The resin is in great request at Parà for caulking ships. The tall straight trunks are used for masts.

No. 25. *Bertholletia excelsa*, Humb. (*Castanheira*, Bras.) (Bark and half-decayed fruits.) Tanaü, Rio Acarà, Parà. September 1849. The bark, beaten as in the accompanying specimen, is used at Parà, along with the *Breô branco*, for caulking ships. The castanhas can only escape from the shell by the decay of the latter, though a forcible entry is usually made into it by the monkeys and pacas when it is already half decayed. I have seen one instance of castanhas germinating while yet within the shell, or *ouriço*, as it is called. Some of the castanha-trees in the forests of Tanaü are the very largest I have anywhere seen; I measured one which was fourteen yards round at the base, and at the height of 50 ft. the circumference was apparently very little less; it must have risen to above 100 ft. before putting forth a single branch.

No. 26. Portion of a twisted *Sipó* from Caripi, on the Rio Parà. This reached from the ground in a nearly straight line to the top of a very lofty tree, having quite the appearance of a cable. I was unable to pull it down in order to examine the leaves. The smaller Sipó, which has insinuated itself between the folds of the larger one, seemed to cease at about half the height of the latter.

No. 27. Bark of a tree called *Tauaré,* used for making the envelopes of cigars. From Tanaü, Parà. September 1849. The single tree I saw of this was too large and lofty to admit of procuring its leaves, but from its habit, smooth fissile bark, and trunk dilated at the base into buttresses (called "Sapopemas") I do not hesitate to consider it a *Lecythis*, though a different species from *L. ollaria.* There is much dispute among the amateurs of tobacco-smoke at Parà, as to whether it is more agreeable when imbibed through cigars of *Tauaré*, or pipes of *Tacuari*; but the *odour* of the former is certainly the less disagreeable of the two.

No. 28. Fishing-net made by the Indians at Caripi, Rio Parà, of the rind of the petiole of the *Jupati* palm. September 1849. These nets are stretched across the mouths of the smaller igaripés at high-water; the receding tide leaves the fish confined in shallow water, where they are easily caught by the hand. When the igaripé is wide, several nets are joined together. The strips of palm are joined together by a Sipó called *Timbo-titica.*

No. 29. *Dipterix odorata* (*Cumarú*, Bras. Tonga bean). Tanaü, Rio Acarà, S. Am. September 1849. (Wood and fruit.)

No. 30. *Tipiti*, or Madiocca-strainer, made by the Indians of Tanaü, Rio Acarà, Parà. The Tipiti is used in this manner:—the two ends are thrust towards each other, so as to increase its diameter and shorten its length; in this state it is filled with the grated root of the Mandiocca; the loop at the lower end is slipped upon a fixed pole; another pole put through the upper loop is passed over a beam, and a heavy weight attached to its opposite extremity, so that it acts as a lever to stretch the Tipiti, and thus squeeze out all the fluid part of the Mandiocca. It is made from the rind of the stem of a plant called *Uarumà-miri*, which is probably one of the *Marantaceæ*.

No. 31. *Sabaó da terra*; a soap made at Parà from Andiroba oil, and the ashes of a tree called *Xiriuba*.

DECADES OF FUNGI; *by the* Rev. M. J. BERKELEY, M.A., F.L.S.

Decades XXV. *to* XXX.

(*Continued from p.* 51.)

Sikkim Himalaya Fungi, collected by Dr. J. D. Hooker.

261. *A.* (Collybia) *ustipes*, n. s.; sparsus; pileo campanulato tenui glabro, margine striato; stipite glabro elongato fistuloso deorsum claviformi extus intusque rubro; lamellis angustis adnexis subdistantibus. Hook. fil., No. 129, cum ic.

HAB. On the ground. Darjeeling, 8,000 feet. October.

Inodorous, soft, brittle. Pileus 1½ inch across, conico-campanulate, dry, delicate, red-brown, thin; margin slightly striate. Stem elongated, 7 inches high, 2 lines thick, composed of fibres, claviform below, fistulose, deep red-brown without and within, strigose at the base. Gills narrow, distant, white, somewhat waved, adnexed.

Resembling *Marasmius erythropus*, and allied to *A. acervatus*, from which it is distinguished by its very long stem, scattered habit, and other points.

262. *A.* (Collybia) *rhodellus*, n. s.; pileo convexo umbilicato membranaceo ex umbilico rugoso-plicato rhodello luteo-variegato; stipite fusco fistuloso; lamellis distantibus crispatis adnatis pallide rubris, interstitiis venosis. Hook. fil., No. 120, cum ic.

HAB. On wood. Darjeeling, 7,500 feet.

Inodorous, delicate. Pileus 1–2 inches broad, convex, umbilicate, dry, pink, tinged with yellow, especially towards the margin, membranaceous, rugoso-sulcate from the umbilicus. Stem 2 inches high, 1 line or more thick, brown, fistulose, sometimes attenuated below, but sometimes equal, or even slightly thickened. Gills moderately broad, arched, adnate, distant, crisped, pink ; interstices veiny.

Belonging to the same section with *A. dryophilus,* though not very closely allied, and approaching near to some *Marasmii.*

263. *A.* (Collybia) *antitypus,* n. s. ; pileo convexo sicco glabro pallido carnoso, margine inflexo ; stipite curvo solido fibroso discreto albo apice dilatato in pileum immisso ; lamellis ventricosis adnexis albis, interstitiis venosis. Hook. fil., No. 6, cum ic.

Hab. On mossy trunks. Darjeeling, 8,500 feet. April, May.

Inodorous. Pileus 2 inches across, convex, smooth, dry, pallid, fleshy, brittle ; margin incurved. Stem 2 inches high, rather unequal, 2 lines or more thick, more or less swollen at the base, dilated at the apex, and sunk into the pileus, from the substance of which it is separated by a definite darker line, of a fibrous substance, solid, smooth externally or sericeo-fibrillose, white. Gills white, broad in front, rounded behind, adnexed, white ; the insterstices venose.

I cannot point out any close ally of this pretty species, the characters of which are, however, remarkable. The gills extend beyond the pileus, and are attached to the broadly-dilated apex of the stem, but are rather adnexed than adnate.

264. *A.* (Collybia) *camptopus,* n. s.; pileo subhemisphærico hygrophano obtuse umbonato viscoso subcarnoso pallido, margine sulcato; stipite incurvo rigido obscuriore; lamellis latiusculis crassis postice rotundatis subliberis. Hook. fil., No. 113, cum ic.

Hab. On wood, &c. Darjeeling, 7,500 feet. September. Not uncommon.

Inodorous, very soft, fleshy, and pellucid. Pileus 2½ inches broad, subhemispherical, with an obtuse umbo, pale, yellowish, viscid, shining ; margin sulcate, though the substance is not very thin. Stem incurved, slightly dilated at the base, solid, very firm and hard, brownish, 2 inches or more high, 2–3 lines thick. Gills distant, waved, rounded behind, nearly free, very thick and fleshy.

Allied to *A. antitypus,* and differing principally from *A. mucidus* in the want of a ring.

265. *A.* (Mycena) *Broomeianus,* n. s. ; tener ; pileo campanulato umbonato plicato hic illic lineis transversis reticulato ; stipite torto fibroso fistuloso ; lamellis angustis liberis. Hook. fil., No. 62, cum ic.

Hab. On dead wood. Darjeeling. June.

Inodorous, tender, brittle. Pileus nearly 3 inches across, campanulate, umbonate, dry, shining, or moist (from rain ?), slightly fleshy, reddish-brown, with a pink tinge, deeply plicato-sulcate, the insterstices sometimes transversely reticulate. Stem 5 inches high, $\frac{1}{3}$ of an inch thick, attenuated upwards, fistulose, composed of fibres, strigose at the base, and there exhibiting within concentric strata, brownish-pink. Gills very narrow, linear, free, white, with here and there a shade of pink. In the young pileus there is no trace of folds.

Evidently allied to *A. pelianthinus*, but larger, and without any discoloured edge to the gills, which differ in outline and in colour from those of that species. The reticulations do not extend to the whole of the pileus. The gills are sometimes forked or anastomose.

266. *A.* (Mycena) *myriadeus*, n. s.; cæspitosus; pileo e campanulato hemisphærico minute umbonato glabro, margine striato; stipitibus plus minus connatis gracilibus fistulosis; lamellis latis planis adnato-subdecurrentibus albis. Hook. fil., No. 130, cum ic.

Hab. Trunks of dead trees, &c. Darjeeling, 8,000 feet. October. Very abundant.

Very much tufted, inodorous, very delicate and brittle. Pileus $\frac{3}{4}$–1 inch across, at first campanulate, then hemispherical, with a minute umbo, smooth, dry, membranaceous; margin striate. Stem 2–3 inches high, not a line thick, united at the base and downy, fistulose, white, with a greyish tinge like the pileus. Gills broad, rather distant, nearly plane, adnate, with a decurrent tooth, white, connected by veins.

Allied to *A. tintinnabulum*, which it resembles in its gills and habit, but not in its delicate texture, umbonate pileus, and absence of viscosity.

267. *A.* (Mycena) *nubigenus*, n. s.; mollis, fragilis; pileo conico-explanato sicco profunde sulcato; stipite adscendente subæquali fistuloso albido; lamellis latis ventricosis adnexis candidis. Hook. fil., No. 78, cum ic.

Hab. On old timber. Darjeeling, 7,500 feet. June. Common.

Odour faint. Soft and brittle. Pileus 2 inches broad, conical, but widely expanded, greyish-brown, dry, deeply furrowed. Flesh very thin, except in the centre. Stem nearly equal, 2 inches high, $\frac{1}{4}$ thick, fistulose, dirty white. Gills broad, distant, ventricose, rounded behind and adnexed, white; interstices even.

Allied to *A. galericulatus*, but not so tough, and remarkable for its broad white gills. The stem is smooth below, and by no means strigose.

268. *A.* (Mycena) *aratus*, n. s.; cæspitosus; pileo e conico-campanulato sulcato; stipitibus tenuibus gracilibus fistulosis; lamellis carneo-variegatis subuncinato-adnatis. Hook. fil., No. 37, cum ic.

HAB. On roots of trees amongst moss. Sinchul, 8,500–9,000 feet. May.

Inodorous, very delicately tufted. Pileus $\frac{1}{3}$ of an inch across, at first somewhat conical, then campanulate, strongly sulcate from near the apex, dry, brittle, rather fleshy for the size, brown above, shaded off into white on the margin. Stems 2–3 inches long, not a line thick, brownish, tinged with pink, fistulose, strigose at the base, sometimes connate. Gills distant, ventricose, shaded with pink, adnate, with a slight tooth, not connected by veins.

This has the habit of *A. muscigenus*, but is larger, and more nearly allied to *A. galericulatus*, but distinct from every described species. A species of *Coprinus* is figured in the same group, which springs from an Ozonium-like Mycelium.

269. *A.* (Mycena) *bicrenatus*, Hook. fil.; pileo conico obtusiusculo carnoso, margine demum expanso recurvo bicrenato; stipite deorsum subincrassato fistuloso; lamellis ventricosis distantibus subliberis carneo-variegatis. Hook. fil., No. 58, cum ic.

HAB. On rotten wood. Jillapahar. June. Abundant.

Inodorous, brittle, of a delicate pinkish white, with deeper shades on the apex of the pileus and gills, and a brown tinge at the base of the stem. Pileus about 1 inch across, conical or conico-campanulate, rather obtuse, smooth, dry, at length striated and splitting slightly in the direction of the gills, fleshy; margin at length expanded and recurved, bicrenate. Stem $1\frac{1}{2}$ inch high, about one line thick, ascending, rather thickened at the base, fistulose. Gills moderately broad, ventricose, ascending, nearly free; the interstices reticulated.

Allied to *A. alcalinus*, but distinguished by many characters from that and others of the section. Unlike that and the other species of the same section growing on wood, it is inodorous. The colours are nearly those of *A. purus*. The whole plant turns black in drying.

270. *A.* (Mycena) *rubiætinctus*, n. s.; totus plus minusve rubrotinctus, inodorus; pileo e conico anguste campanulato sicco plicato;

stipite fistuloso; lamellis subventricosis liberis. Hook. fil., No. 84, cum ic.

HAB. On trunks of trees. Darjeeling, 7,500 feet. June. Rare.

Inodorous, dry, fleshy, brittle, delicate, slightly tufted. Pileus ½ an inch broad, ¾ of an inch high, at first conical, then elongato-campanulate, plicate, pale madder-red. Stem 2½ inches high, 1 line or more thick, fistulose, deep red. Gills moderately broad, ventricose, ascending, free, shaded with pale red.

Resembling somewhat *A. hæmatopus*, but more nearly allied to *A. plicosus* and *A. metatus*, but differing, as the last, from other species of their section growing on wood, in being inodorous.

271. *A.* (Mycena) *xanthophyllus*, n. s.; pileo e campanulato hemisphærico subcarnoso striato; stipite adscendente fistuloso; lamellis flavis demum purpureo-variegatis latis rotundatis liberis. Hook. fil., No. 42, cum ic.

HAB. On roots of trees. Darjeeling, 8,000 feet. May.

Inodorous, fleshy and brittle, rather delicate. Pileus 1–1½ inch across, at first conico-campanulate, at length hemispherical, smooth, striate, variegated with pink in the centre, shaded off into grey, with sometimes a yellow tinge on the margin. Stem ascending, flexuous, 1½–2½ inches high, 1½ line thick, nearly equal, yellowish or purple, fistulose. Gills broad, rounded behind, free, pure yellow, at length shaded with red or purple, rather distant, slightly if at all connected by veins.

Remarkable for its broad yellow gills.

272. *A.* (Mycena) *russulinus*, n. s.; pileo tenui submembranaceo sicco russulino hemisphærico, margine sulcato; stipite adscendente fistuloso umbrino; lamellis latiusculis pallido-flavis adnatis subuncinatis. Hook. fil., No. 43, cum ic.

HAB. On trunks of trees. Darjeeling, 8,600 feet. May. Abundant.

Inodorous, delicate, brittle. Pileus ¾–1 inch broad, hemispherical, sometimes obtusely umbonate, thin, submembranaceous, dry, of a dull red; margin sulcate. Stem 1–2½ inches high, about 1 line thick, equal, ascending, umber brown, fistulose. Gills rather broad, distant, adnate, with a small tooth.

Allied to the foregoing species, but very distinct in its uniform red pileus, dark stem, and pale subuncinate gills.

273. *A.* (Mycena) *rufatus*, n. s.; pileo conico hemisphærico viscido rufo striatulo carnosulo; stipite subtiliter fistuloso concolore;

lamellis pallide flavis adnexis demum rufo-tinctis. Hook. fil., No. 44, cum ic.

HAB. On trunks of trees. Darjeeling, 8,000 feet. May. Abundant.

Inodorous, rather firm. Pileus ½ an inch broad, conico-hemispherical, red-brown, smooth, viscid, fleshy in the centre, striate. Stem short, slender, 1 inch high, scarcely 1 line thick, generally ascending, rufous, minutely fistulose, nearly equal. Gills rather narrow, pale yellow, rounded behind, nearly free, at length blotched with red-brown.

Allied to the last, but distinguished readily by its viscid, firmer pileus, and ultimately red-brown gills.

274. *A.* (Mycena) *manipularis*, n. s.; valde cæspitosus, tener, fragilis; pileo convexo obtuso sicco striato; stipite gracili; lamellis flavis latiusculis adnatis. Hook. fil., No. 49, cum ic.

HAB. On trunks and stumps. Sinchul, 8,500 feet. May. Abundant.

Inodorous, densely cespitose, small, very brittle. Pileus ¼–½ inch broad, convex, obtuse, smooth, dry, thin, striate, shaded with grey and yellow. Stems slender, 1–2 inches high, not ½ a line thick, minutely fistulose, grey, downy at the base. Gills rather broad, ventricose, adnate, yellow.

Distinguished from neighbouring species by its delicate, highly-tufted pilei, and small size. Dr. Hooker describes the pilei as dry; they have, however, the appearance of being somewhat gelatinous in substance, though dry externally.

275. *A.* (Mycena) *prasius*, n. s.; pileo campanulato fortiter sulcato sicco pallide prasio; stipite elongato tenui fistuloso concolore basi incrassato rubro; lamellis paucis niveis liberis. Hook. fil., No. 140, cum ic.

HAB. On the ground. Top of Tonglo, 10,000 feet.

Dry, brittle, inodorous, very delicate. Pileus ¾ of an inch across, campanulate, obtuse, membranaceous, pale leek-green, variegated with about 18 paler stripes, converging in pairs, rather more than half-way up the pileus, between which it is strongly sulcate. Stem above 3 inches high, 1 line thick, fistulose, smooth, green, except at the swollen base, where it is red. Gills few, white, ventricose, free or adnexed.

An exquisite species, which is perhaps as nearly allied to *A. epipterygius* as to any described species, but without any of its viscosity. *A. chloranthus* has similar colour, but is very different, especially in the gills. It does not, indeed, come very near to any European type.

276. *A.* (Mycena) *rufopictus*, n. s.; fascicularis, fragilis; pileo viscosissimo plano e centro radiato carnosulo; stipite elongato fistuloso glabro; lamellis adnatis rufulis. Hook. fil., No. 48, cum ic.

Hab. On dead wood. Darjeeling, 8,000 feet. May. Abundant.

Tufted, brittle, inodorous, red-brown. Pilei ¾–1 inch broad, extremely viscid, nearly plane, slightly fleshy, marked with darker lines radiating from the centre. Stems elongated, 3 inches high, scarcely 2 lines thick, nearly equal, smooth. Gills nearly plane, paler than the pileus, distant, adnate, at length subdecurrent.

Allied to *A. epipterygius*, but distinct from every described species.

277. *A.* (Pleurotus) *apalosclerus*, n. s.; graveolens, umbrinus; pileo udo tenero molli umbilicato squamulis acutis exasperato; stipite firmo rigido solido deorsum attenuato; lamellis decurrentibus interstitiis venosis. Hook. fil., No. 80, cum ic.

Hab. On trunks of trees. Darjeeling, 7–8,000 feet. June, July. Abundant.

Odour strong, disagreeable. Very soft, fleshy, and brittle. Pileus 2½–3 inches broad, umbilicate, depressed, umber, moist, rough with raised pointed scales or warts; margin striate. Stem 1½ inch high, 2 lines thick in the centre, ascending, attenuated downwards, solid, firm, darker than the pileus. Gills rather narrow, decurrent, pale umber, crenate; interstices venose.

This has precisely the habit of some *Lentini*, but is of a soft, tender consistence. The stem is barely excentric, but as the edge is quite expanded, it comes better amongst the *Pleuroti* than in the former section of *Omphalia*, in which alone it could be placed. It contracts very much in drying, and in the herbarium shows no *Lentinoid* aspect. It exhibits, indeed, a type quite distinct from anything hitherto described.

278. *A.* (Pleurotus) *verrucarius*, n. s.; pileo umbilicato gilvo tenui subfragili humido; stipite solido firmo glabro; lamellis pallide ochraceis latiusculis. Hook. fil., No. 20, cum ic.

Hab. On dead wood. Darjeeling, 7–8,000 feet. May, June.

Pileus 4 inches or more across, umbilicate, or sometimes infundibuliform, thin, rather brittle, moist, but not viscid, reddish-grey, sprinkled with conical black warts, which are crowded in the centre; margin inflexed. Stem 1–2 inches high, ½–1 inch thick, yellowish, smooth, firm, solid, yellowish; sometimes rough with jagged points, as if torn from the sides. Gills pale, ochraceous, decurrent, moderately broad, thin, transparent when dry.

The pileus, when dry, is transparent. The warts are very remarkable and quite distinct from the pileus, indicating, as it should seem, a sort of universal volva.

This very fine species has quite the habit of *Panus* or *Lentinus*, but the brittle pileus is against its being associated with either genus. There is no ring. Like the foregoing, it is a *Clitocybe* in its scarcely excentric pileus. The species of that tribe, however, are essentially terrestrial, and occur very rarely on wood, and then only when it is almost reduced to mould by rottenness.

279. *A.* (Pleurotus) *anserinus*, n. s. ; imbricato-lobatus; pileo sericeo-virgato umbrino-gilvo, margine involuto ; stipite brevi laterali ; lamellis candidis angustis confertissimis. Hook. fil., No. 64, cum ic.

HAB. On dead wood. Jillapahar, 7,500 feet. June.

Odour rather sweet, faint. Pileus forming an imbricated, lobed, flabelliform mass, 4 inches or more across, reddish grey, inclining to umber, dry, smooth, but marked with silky, virgate lines ; substance softish, fleshy ; margin involute. Stem short, being in fact little more than the attenuated point of attachment of the pileus, obtuse. Gills very much crowded, narrow, white, here and there tinged with red running down the stem, not visibly echinulate.

Approaching nearest, perhaps, to lobed forms of *A. petaloides*, but resembling closely no described species. In drying it assumes a brown tinge, and the pileus splits very much. The lobes resemble in colour and in appearance those of a goose's liver, whence I have taken the name.

280. *A.* (Pleurotus) *eöus*, Berk. ; imbricatus, tenerrimus, totus pallide rubellus ; pileo tenui glabro ; stipite obsoleto ; lamellis angustis decurrentibus. Hook. fil., No. 9, cum ic.

HAB. In the hottest valleys, on trunks of dead trees, in open places. Sikkim Himalaya. May.

Odour faint. Imbricated, extremely beautiful and delicate, of a pale Aurora-red. Pileus 3 inches or more across, spathulate at first, then flabelliform, smooth, slightly rimose, thin, but fleshy, brittle ; edge incurved. Stem obsolete. Gills very narrow, decurrent, extremely thin, crowded, reticulated at the base.

Allied to *A. petaloides*, but differing in its uniform tint, in the absence of the villous, channelled stem, and in its flabelliform, not permanently spathulate pileus.

281. *A.* (Pleurotus) *ninguidus,* Berk.; niveus, tenerrimus; pileo imbricato flabelliformi submembranacco; stipite prorsus nullo; lamellis latiusculis postice rotundatis. Hook. fil., No. 12, cum ic.

Hab. Hot valleys, on dead timber. May. Sikkim Himalaya.

Inodorous, imbricate, white, extremely delicate. Pileus 2 inches or more broad, flabelliform or suborbicular, entire, fleshy, but very thin, smooth, convex. Stem altogether wanting. Gills thin, crowded, slightly ventricose, rounded behind.

Allied to *A. eöus,* but a very different species.

282. *A.* (Pluteus) *palumbinus,* n. s.; pileo convexo umbonato glabro erugi carnosulo palumbino; stipite solido albo deorsum leviter incrassato; lamellis ex albo roseis liberis. Hook. fil., No. 72, cum ic.

Hab. On trunks of living trees. Darjeeling, 7,500 feet. Rare.

Inodorous. Pileus 2 inches across, convex, subhemispherical, obtusely umbonate, dry, smooth, even, dove-coloured. Stem about 2 inches high, $\frac{1}{3}$ of an inch thick, ascending, white, solid, slightly thickened downwards, and expanded at the base. Gills rose-coloured, at first white, perfectly free.

Nearly allied to *A. phlebophorus,* but quite even and distinctly umbonate. There is no other species with which it can be confounded, except *A. Curtisii,* Berk., which is at once distinguished by its viscid, liver-coloured pileus.

283. *A.* (Pluteus) *chrysoprasius,* n. s.; pileo hemisphærico subconico carnosulo pallide prasio glabro; stipite elongato fistuloso albo; lamellis latis alutaceis. Hook. fil., No. 142, cum ic.

Hab. On burnt fir-roots. Base of Tonglo, 2,000 feet.

Inodorous. Pileus 1 inch or more across, conico-hemispherical, scarcely campanulate, pale leek-green, dry, smooth, even; flesh thin, green like the pileus. Stem 3 inches high, 2 lines thick, white, fistulose, slightly incrassated downwards. Gills broad, ventricose, rounded behind, perfectly free, tan-coloured.

Of this, unfortunately, no specimens have been preserved, but the peculiar characters of the gills are such as to leave no doubt as to its proper position. It is, however, very distinct in character from every species of its section. *A. leoninus* alone exhibits the yellow tone of its gills.

284. *A.* (Entoloma) *Goliathus,* Hook. fil. ; giganteus ; pileo carnoso e conico convexo fortiter umbonato sicco sinuato sulcato-rugoso; stipite valido solido subbulboso ; lamellis subliberis. Hook. fil., No. 92, cum ic.

Hab. In woods. Darjeeling, 7,500 feet. June. Rare.

Odour like that of the common mushroom. Pileus dry, fleshy, brittle, soon decaying, 8–12 inches across, at first ovato-conical, then expanded, convex, with a very strong umbo, smooth, livid-brown, deeply and irregularly grooved and sinuated; margin at length inverted and curled back. Flesh stained with brown beneath the cuticle, white elsewhere. Stem 4–7 inches high, $1\frac{1}{2}$–2 inches thick, incrassated or bulbous at the base, of the same colour as the pileus. Gills varying somewhat in width, rounded behind and nearly free, pale brown, at length rusty rose-coloured.

This species is allied to *A. sinuatus,* from which it differs in its very rugged pileus, strongly-developed umbo, and in the gills, which, in proportion to the pileus, are often very narrow.

285. *A.* (Entoloma) *cystopus,* n. s. ; pileo conico glabro hygrophano subcarnoso; stipite cavo deorsum incrassato subfusiformi; lamellis adscendentibus undulatis postice attenuatis adnexis pallido-roseis. Hook. fil., No. 1, cum ic.

Hab. On dead leaves, twigs, moss, &c. Darjeeling, 8,000 feet. April 22, 1848.

Pileus $1\frac{1}{2}$ inch or more across, nearly 1 inch high, conical, with the base somewhat expanded, slightly waved, greyish, hygrophanous, not viscid, scarcely striate, subcarnose, inodorous. Stem 3 inches high, more than $\frac{1}{3}$ of an inch thick at the base, about $\frac{1}{8}$ only at the apex, smooth, bulbous below and downy, rapidly attenuated upwards, fistulose, the cavity penetrating into the flesh of the pileus, grey, with a pinkish tinge. Gills ventricose, much attenuated behind, slightly adnexed, but by no means rounded behind or truly free. Spores obliquely ovate, angular.

This curious species has somewhat the habit of *A. butyraceus,* but its nearest allies are *A. rhodopolius* and *A. turbidus.* The margin of the pileus, as in the former species, seems to be slightly inflexed.

286. *A.* (Volvaria) *Thwaitesii,* Hook. fil. ; pileo amplissimo conico-expanso fortiter umbonato carnoso luteo sicco sericeo nitido, margine appendiculato ; stipite solido sursum attenuato solido basi bulboso ;

volvâ ocreatâ, margine leviter patente; lamellis liberis carneo-fuscis, postice valde attenuatis. Hook. fil., No. 85, cum ic.

HAB. On dead wood. Darjeeling, 7,000 feet. June. Rare.

Inodorous. Pileus 9 inches or more broad, expanded, but rising in the centre to a large conical umbo, pale yellow, dry, glossy and shining, clothed with beautiful silky threads, extremely fleshy in the centre, and decidedly so as far as the termination of the gills, beyond which the margin is produced into a ragged membrane. Flesh tinged with yellow, splitting towards the edge. Stem stout, ascending, 8 inches high, more than an inch thick in the centre, tapering above, bulbous below, solid, white, with a few brownish patches, striate, furnished below with a volva, the edges of which only are free. Gills very broad, ventricose, crowded, attenuated in front, and very greatly so behind, so as to be decidedly acuminate, quite free; spores red, with a brownish tinge.

A most splendid species, allied to *A. bombycinus*, from which it is distinguished by its size, its less ample, closely fitting volva, its very acuminate gills, which have a brownish tinge, and its smaller spores. It must rank amongst the princes of the Agarics.

287. *A.* (Pholiota) *examinans*, n. s.; pileo carnoso convexo-expanso obtuso lævi sicco glabro, margine striato; stipite adscendente brevi fibrilloso, annulo fugaci; lamellis adnatis pallidis postice acutis.

HAB. On dead wood. Darjeeling.

Cespitose. Pileus 3 inches broad, convex, expanded, smooth, carnose, tawny; margin striate. Stem 2 inches high, $\frac{1}{4}$ of an inch thick, ascending, fibrillose; ring fugitive. Gills moderately broad, pale tawny, adnate, acute behind. Spores elliptic, quite smooth, ferruginous, tinged with olive.

Allied to *A. pudicus*, especially the tawny variety, but distinguished by its fibrillose stem, fugitive veil, differently formed gills, but especially by its much smaller spores, which, as in that species, are perfectly smooth and slightly more convex on one side than the other.

288. *A.* (Pholiota) *microsporus*, n. s.; fascicularis; pileo viscoso glaberrimo convexo carnoso; stipite viscidulo; annulo contexto tenui; lamellis argillaceis angustis postice attenuatis. Hook. fil., No. 45, cum ic.

HAB. On dead wood. Darjeeling.

Fasciculate. Pileus 2–3 inches broad, convex, viscid, quite smooth, pale tawny, darker in the centre, with livid shades towards the margin.

Stem 2–3 inches high, nearly equal, but attenuated at the very base, varying much in thickness, viscid, smooth, of the same colour as the pileus, at length hollow. Ring thin, persistent, viscid externally. Gills narrow, attenuated behind, argillaceous. Spores extremely small, argillaceous.

Distinguished from all neighbouring species by its extremely small spores. Its nearest ally, perhaps, is *A. pudicus*, but it has the habit of *A. fascicularis*. It has also a strong resemblance to *A. polychrous*, Berk., which has, however, darker and larger spores.

* *A. aurivellus*, Batsch. Hook. fil., No. 50, 141, cum ic.

Hab. On stumps of trees. Darjeeling, 7,000 feet; Tonglo, 5,000. May, June. Very abundant.

This species differs from *A. squarrosus* in its rather viscid pileus, and redder spores, as also in the rounded not subdecurrent gills. The colour of the spores in German specimens is precisely the same as in those from the Himalayas.

289. *A.* (Flammula) *chrysimyces*, n. s.; cæspitosus; pileo convexo-umbonato sicco innato-flocculoso carnoso, stipiteque deorsum incrassato cavo aureo; lamellis ventricosis adnexis carnosis ex aureo fulvis flavopunctatis. Hook. fil., No. 109, cum ic.

Hab. On dead wood. Darjeeling, 7–8,000 feet. August, September. Abundant.

Odour faint, sweetish. Fasciculate. Pileus 3 inches or more broad, convex, broadly umbonate, fleshy, brittle, floccose, golden yellow. Stem 3 inches high, varying much in thickness, hollow, incrassated below, slightly floccose, at length smooth, of the same colour as the pileus; ring more or less evanescent. Gills moderately broad, ventricose, fleshy, at first yellow, then cinnamon, but sprinkled with yellow specks. Spores ochraceous, rather small.

This species bears some resemblance to *A. aureus*, but it is not only smaller, but is at once distinguished by its gills sprinkled with yellow specks, as in some other allied species, by its far smaller spores, and the absence of a distinct ring. Slight traces of the veil remain on the margin.

290. *A.* (Naucoria) ***scrupeus***, n. s.; pileo hemisphærico carnoso umbonato lacunoso viscido, margine incurvato; stipite elato cavo; lamellis linearibus postice rotundatis. Hook. fil., No. 56, cum ic.

Hab. On moist earth. Darjeeling, 7,500 feet. June.

Odour like that of *A. campestris.* Pileus 2 inches or more across, hemispherical, fleshy, strongly umbonate, viscid, lacunose, dull yellow, shaded with rufous, border arched, extreme margin incurved. Stem 6 inches or more high, $\frac{1}{3}$ of an inch thick, slightly attenuated upwards from the somewhat bulbous base, pale, rufous, hollow. Gills narrow, linear, rounded behind, pale, dull, cinnamon, with the margin white. Spores elliptic, smooth.

Resembling somewhat *A. lacrymabundus*, but distinguished at once by its lacunose, viscid pileus, and different spores. I cannot point out accurately its nearest affinity, which is, perhaps, with *A. festivus.* It seems, however, in point of fact to present quite a peculiar type.

* *A. tener*, Schæff. Hook. fil., No. 57, 135, cum ic.

HAB. On the ground. Jillapahar. June. Very rare. Darjeeling, 7,500 feet. October.

(*To be continued.*)

Extracts from the private Letters of DR. J. D. HOOKER, *written during a Botanical Mission to* INDIA.

DARJEELING TO TONGLO.

(*Continued from p.* 59.)

If I have called the climate of Darjeeling disagreeable in comparison to many other temperate regions, it is the very reverse when contrasted with that of the plains of India. There human nature is prostrated by the heat, and all other nature by the rain, at this same season, which is cool and healthy at Darjeeling. When the cholera stalks as a destroying angel, viewless and irresistible, over the length and breadth of the land, annually claiming its thousands of the native population, while a vitiated atmosphere is sowing the seeds of chronic disease throughout the European population, these hills enjoy an immunity from both the one and the other pest; and if their climate cannot eradicate, it yet braces the constitution to bear functional disease better, restoring strength, energy and spirits to the system, and perfect health, too, where chronic ailments are not established.

There is one other point of view to which I must allude, in respect to Darjeeling; and this, to a geographer, is peculiarly interesting;—

though only of nine years' standing, the station has become, in spite of numerous, and some very serious, obstacles, the emporium of a rising trade with Bhootan, Thibet, and Nepal. The necessity for a sanitarium near Calcutta was very obvious; and Sikkim, a protected state, was the only province of the hills in this direction where we had any show of right to demand a lease of ground. The kingdom was overrun by the Ghorkhas, from whom we wrested it in 1817, restoring it to the deposed Sikkim Rajah, and ensuring him our friendship as its sovereign, with the view of placing a fender between Nepal and Bhootan, the latter being a lawless country, which would otherwise have fallen a prey to the Ghorkhas, who to this day thirst for possession of the whole Sub-Himalaya, and hold our protection of Sikkim to be an invidious proceeding.

Long left to himself, the Sikkim Rajah ungratefully forgot his dependence upon us, and adopted the jealous policy of his neighbours, the Chinese (Thibetans), Bhootanese, and Ghorkhas, excluding Europeans, and refusing every just or liberal demand for free trade and intercourse between the mountains and plains. It was not, therefore, without reluctance, and some intimidation, that the station of Darjeeling (a long strip extending from the plains into the heart of his mountain-territory) was obtained from him, on the payment of a just remuneration. An imbecile, probably so by nature, and certainly by habits and education, ignorant of our real power, disbelieving our professions, and accustomed to rule by intimidation, though he was awe-struck by our cool proceedings, he was not likely either to act towards us with judgment or in any conciliating spirit. Direct opposition he dares not offer, but nothing could be easier (he thought) than to put such obstacles in our way as should lead to our either acting on the offensive (when he deems himself safe in his fastnesses), or abandoning the station. As the natives of the plain are unserviceable at this elevation, the British have always required the attendance of the hill-people, and of them the Rajah attempted to deprive us: the traders from the neighbouring countries he either wholly excluded from passing through his dominions, or heavily taxed their merchandize: his country became the refuge for notorious offenders, whom, in defiance of treaty, he refused to surrender, and various other annoyances were ventured by him. To obviate these difficulties, no little skill and prudence, and even more patience and consideration, were needed on our part. To teach any barbarian that we can be, but are not, aggressors or oppressors, is no easy task; while by refusing all personal intercourse, or indeed any other communication than through his own messengers, we were constantly exposed to receive garbled reports of his intentions, and he, invidious ones of our motives and actions; the go-betweens being frequently people more anxious than the Rajah himself to prevent free intercourse. By our adopting a very firm, but conciliating policy, listening to his real grounds of complaint, exposing fully to his own comprehension the absurdity of attempting to bias us by the weak subterfuges he adopted, and proving to him that we would have as much of our way as we could without doing him injustice, the Rajah was brought to his bearings, if not to his senses; and though still dissatisfied, grasping, insolent, and overbearing, he is fain to acknowledge himself benefited by our proximity, and has granted much that he had withheld, at first, in the unequal contest for total independence of us, his allies and protectors.

Darjeeling has thus become the only "free port" between Nepal and Upper Assam: to it natives of all countries may resort, and thither the mountaineers especially flock; whilst an annual fair, which is held at the foot of the hills, and established by the Superintendent of Darjeeling, offers a still better opportunity to the hill-people to dispose of their goods, and to receive in return the produce of the plains. At this (the Titalya fair) prizes are given for the best grain and stock, and various other inducements held out (with eminent success) for the improvement of agriculture and trade.

I have before told you how much I like the Lepchas, and dwelt on the confidence which this naturally timorous people place in the English, at Darjeeling. It affords one of the best proofs how much may be done by kindness and firmness, amongst the very tribes to whom our name was once a terror, and to whom their chief, the Rajah, perhaps wishes it might still be so. A few years ago, there were scarce half-a-dozen of these people in the then Rajah's property, now comprehended in Darjeeling; at present there are many hundreds, and as many of various other hill-tribes, all well-ordered, peaceably conducted, happy, and useful, and if not very industrious and enterprising, yet far more so than their brethren in any other part of Sikkim.

It is highly interesting to trace the rise and progress of a little settlement, whether it be planted in the wilds of Australia, amongst

Fitch del. et lith.

R.B. & R. imp.

Jute.

the savages of New Zealand, the sandy plains of South Africa, or the interminable forests of America. In none of these countries have tribes so mixed, or so civilized, been dealt with; and still less has there existed such jealousy on one part, and so timorous a nature on the other. It is true we have been backed with that terrible renown for fame and strength which extends along the foot of the mountains; but the English geographer, who judges of our hill influence by the undisputed sway we exercise over the plains of India, and attributes to it whatever success has attended the labours of the servant in civil employ amongst the rude mountaineers, little knows how far more imposing to the latter are the knife of the Ghorka, the bow and arrows of their own Rajah, or the stern guard of the inflexible Mandarin stationed at the snowy passes of the frontier.

(*To be continued.*)

JUTE; CORCHORUS CAPSULARIS, L. By SIR WILLIAM JACKSON HOOKER, D.C.L., F.R.S.A.

~~TAB. III.~~

We have in our last volume given a few particulars relative to the fibre of this plant, as having been employed by the natives of India, and now extensively in Britain; and we promised some further notice of it, together with a figure. The plant belongs to a natural family (*Tiliaceæ*), eminently distinguished for the strong and useful fibre of its bark: the Lime-tree is a familiar example. Of the genus *Corchorus*, thirty-six species are enumerated by authors, chiefly inhabitants of the tropics or of warm countries, both in the old and in the new world. The generic name (κόρχορος) was applied by the ancients to some common potherb, and particularly to this genus, of which the most common and best-known species (*C. olitorius*) is employed as a pot-herb, especially among the Jews, and hence its name *Olus judaicum*, according to Avicennes. The character of *Corchorus*, as given by M. De Candolle, is "*Cal.* 5-sepalus deciduus. *Pet.* 5. *Stam.* plurima. *Stylus* subnullus. *Stigmata* 2–5. *Capsula* subulæformis aut rotunda, 2–5-valvis, 2–5-locularis, valvis medio septiferis. *Semina* biserialia."

Most of the species have an elongated or pod-like fruit (hence one species is named *C. siliquosus*); but, in the present instance, the fruit is nearly globose, and more like the usual form of a capsule, from which circumstance it has received the appellation of

Corchorus *capsularis*; capsulis subglobosis depressis rugoso-muricatis glabris, foliis oblongis acuminatis serratis, serraturis infimis setaceis. *Linn. Sp. Pl. p.* 746. *De Cand. Prodr.* 1. *p.* 505. *Wight, Ic. Pl. Ind. Or.* 1, *f.* 311. Ganja sativa, *Rumph. Amb.* 5, *p.* 78, *f.* 2.

It is an annual plant, and a common weed in the East Indies, much cultivated in Bengal (Dr. Roxburgh says in China also) during the rains, for the fibres of its bark, of which the "gunny," or rice bags, &c., are made. Roxburgh gives the Bengalese name as "*Ghinalta pat.*" To this country, however, it is certainly imported under the more familiar name of *Jute*. Nevertheless, Dr. M'Culloch, in the edition of his 'Commercial Dictionary' for 1846, says that "*Jute* consists of the fibres of two plants, called *chouch* and *isbund*, *Corchorus olitorius* (the potherb above alluded to) and *C. capsularis*. These are extensively cultivated in Bengal, forming, in fact, the material of which gunny bags and gunny cloth are made. The fibre fetches nearly, though not quite, as high a price as *Sunn* (*Crotalaria juncea*). It comes into competition with flax, tow, and codilla, in the manufacture of stair and other carpets, bagging for cotton and various goods, and such like fabrics, being extensively used for those purposes in Dundee. But it is not suitable for cordage and other articles into which hemp is manufactured, from its snapping when twisted, and rotting in water. The quantities imported, and the prices, have fluctuated very greatly during the last dozen years; but from £12 to £15 a ton appears to be a fair average. When first introduced into this country in 1815, the price of *Jute* varied from £35 to £40 a ton. It was then, however, very little known, and did not in fact begin to come into anything like general use as bagging till 1827 or 28."

Tab. III. Fig. 1. Capsule; 2, expanded flower:—*magnified.*

BOTANICAL INFORMATION.

PROFESSOR DE CANDOLLE.

We regret to learn that in consequence of the state of political affairs in Geneva, the excellent M. De Candolle has given in his resignation of the botanical professorship of that city, and of the direction of the Botanic Garden there; both, we believe, created purposely for his distinguished father. It is, however, on the other hand, some consolation to know that this retirement gives him leisure, which enables him to promise a visit to his friends in England during the present year.

DR. ASA GRAY.

The botanical world will be glad to learn that the herbarium formed during the extensive voyage of the "United States Exploring Expedition, under Commander Wilkes," is confided to Dr. Asa Gray for publication (the Californian and Oregon plants excepted, which were long ago transmitted to Dr. Torrey, to be incorporated into the 'Flora of North America.') Already Dr. Gray has studied the *Compositæ*, his favourite family, and he is at this time engaged with the Sandwich Island collection, the fullest and most complete of the whole, and he will probably publish a little *Prodromus* or *Precursor Floræ* of these islands in the first instance. This can only be done by a careful comparison of the specimens with the collections from the same regions in London and Paris; and our friend will, we are sure, receive a hearty welcome from the naturalists in England and upon the continent, on his coming among us again.

Plants of SPAIN.

The indefatigable M. Bourgeau (not Borgeau, as the name was by us inaccurately written) has no sooner distributed his beautiful collections made last year in the south-west of Spain, than, under the auspices of "L'Association Botanique Française d'Exploration," he is prepared for another Spanish excursion during the present year (1850). The special object of this mission is the southern portion of the East of Spain. It has been arranged for him to leave Paris on the 20th of February, for Carthagena. The journey will be of seven months' duration, and be divided into three distinct portions:—1. He will visit the environs of Carthagena and Murcia, and the shores between Carthagena and Cape Gaeta. 2. The environs of the towns of Ziezar, Tobara, Chinchilla, &c., a part of the plains of La Mancha, and the whole of the Sierra de Alcaras will be explored. 3. M. Bourgeau will proceed from Chinchilla to Alicant, by crossing the different chains of mountains between the two towns, and then return to Paris.

Death of Dr. Koch.

We are sorry to have to announce the death of Dr. and Professor Koch, of Erlangen, author of the 'Synopsis Floræ Germanicæ et Helveticæ,' and of many other useful and talented botanical disquisitions. His Memoir on the Umbelliferæ, published in 1824, in the 12th volume of the 'Nova Acta Academiæ Nat. Curios.,' contributed more towards fixing the limits of the genera on a true and firm basis than the works of all preceding writers on the subject; and his knowledge of European plants was surpassed by few.

It is with much regret we announce the recent decease of John Nuttall, Esq., of Tithewer, in the county of Wicklow, Ireland. Although he wrote nothing on the science of botany, usually so called, he was eminently successful as an arboriculturist, particularly in cultivating such Conifers as were adapted to the climate of Ireland. On his property in Wicklow, he grew more species of *Pinus* than could be found on any other in the country. The trees are remarkable for their health and beauty, and among them is a splendid *Abies Douglasii*, from whose cones many seedlings have been raised. Mr. Nuttall's knowledge of indigenous botany was also extensive, and cultivated by him in common with his and our friend the late Dr. Taylor, of Kenmare, at a period when such pursuits were less followed in Ireland than they are at present.

Plants of the Quitinian Andes.

A continuation of the sets of the plants of the Andes of Quito has been received by Mr. Heward, Young-street, Kensington, for distribution to the subscribers.

NOTICES OF BOOKS.

Amidst the many recent political disturbances in Paris, science has not been wholly neglected by its votaries, for there has appeared of late one of the most useful and beautiful of botanical publications, on a subject which needed beyond any other full and faithful illustration: "Histoire Naturelle des Quinquinas, par M. H. A. Weddell, Docteur en Science, accompagné de 34 planches dessinées par Riocreux et Steinheil: folio. Paris, 1849."

This important work we had the pleasure of mentioning in an early number of our last volume of this Journal, when noticing the "Revue du genre Cinchona" of the same able author. During the interesting scientific mission under M. De Castelnau, undertaken in 1843 for the exploration of the interior provinces of Brazil and Peru, M. Weddell, as there detailed, formed one of the party. After accompanying the other officers for two years, he separated from them in 1845, upon the confines of Mattogrosso, in order to carry out his researches in another direction, and which he continued for a year after their return, his own taking place in 1848. The Museum of Natural History of Paris, we learn from the 'Annales des Sciences Naturelles,' who had entrusted this mission to M. Weddell, "have only to congratulate themselves on this appointment; and they desire to render justice to the courage, intelligence, and scientific knowledge of the young traveller, who with the feeble means which we were able to place at his disposal, alone, in the midst of an immense territory, difficult of investigation and almost a desert, has so well accomplished his object."

Among other important results of the journey, is the publication of this work on *Cinchonas*. Few plants have been more celebrated, few have rendered greater services to mankind than these; yet none have been less understood or more imperfectly studied. In 1639 the medicinal properties of the *Cinchonas* were first known to Europeans residing in Peru, and the first writings upon the subject appeared in 1650. La Condamine and Joseph de Jussieu visited the *Cinchona* forests of Loxa at nearly one and the same period, 1737. Thirty years later, Ruiz and Pavon, and the celebrated Mutis, were engaged by the Spanish Government to inspect the *Cinchona* regions, the former in Peru, the latter in New Grenada. Humboldt and Bonpland contributed, perhaps, more than any other travellers towards a more correct knowledge of the Peruvian Barks; but it was left to M. Weddell to determine many dubious points in their history by personal investigation, correct analysis, chemical and otherwise, and by a series of the most beautiful designs. "Il a cherché avec les bûcherons, ou cascarilleros, ces arbres épars au milieu de ces immenses forêts, à plusieurs journées de tout lieu habité. Il a campé bien des jours et des nuits avec eux; il a accompagné les écorces, objet de son étude, passant de mains en mains jusqu'au port où elles s'embarquent, changeant de prix à chaque dépôt; il a pu, sur tous les points, connaître par lui-même la vérité, qu'on ne sait pas toujours sur les marchés d'Amerique et, à plus forte raison, d'Europe."

He has determined the geographical distribution of the *Cinchonas*, as defined on a map, accompanying the work, of the region they occupy in the great Cordillera of the Andes, to extend from the 19th degree of south latitude to the 10th of northern, forming the large arch of a circle, whose convexity is towards the west: the western portion is most central, near Loxa, in the 4th degree of south latitude and in the 80th of long. (merid. of Paris): its extreme north point is near the 69th, and the extreme south in the 65th degree. A reference to the map will show that the chief *Cinchona* districts are the eastern declivities of the Cordillera, within the limits north and south above mentioned, and watered by the sources of the Amazon and the Orinoco.

In our former notice we mentioned the five genera into which M. Weddell thinks fit to divide *Cinchona* of Linnæus; and for their description, as well as for the ample details of the chemical and medicinal qualities, we must refer our readers to the work itself. The plates are admirable. The frontispiece represents "L'Exploitation du Quinquina dans les forêts de Carabana au Pérou," and the scene is in the valley of San Juan del Oro. Tab. 1 and 2 exhibit the anatomy of *Cinchona*. Tab. 3–22, inclusive, are devoted to species of true *Cinchona*; 23–25, to *Cascarilla*; 26, to *Ladenbergia* and *Gomphosia*; 27, to *Lasionema* and *Pimentelia*; 28–30 are charming coloured figures of the barks themselves of commerce; and the concluding plate is the "Carte générale des Andes intertropicales, montrant la distribution géographique du genre *Cinchona*."

GRAMINEÆ *Herbarii Lindleyani*; auctore NEES AB ESENBECK. 1849.

(*Communicated by* DR. LINDLEY.)

Cuming.	711.	Spinifex squarrosus; var. *a*, *N. ab E.*
,,	448.	Coix exaltata, *Jacq.*
,,	2290.	529. Leersia Luzonensis, *Presl.*
,,	2429.	Thouarea sarmentosa, *Pers.*
,,	266.	Panicum Indicum, *Linn.*, racemo simplici.
,,	720.	Paspalus scrobiculatus; *β*, *N. ab E.* *P. cartilagineus*, Presl.
,,	2410.	,, longifolius; *β*, Zeylanicus, *N. ab E.*
,,	2288.	Isachne Javana, *N. ab E.*
,,	1363.	Coridochloa semialata, *N. ab E.* var.? Margo glumæ superioris haud repanda, sed infra medium obtuse unidentata; folia angusta.
,,	580.	Panicum flavidum, *Retz.*
,,	532.	,, brizoides, *Linn.*
,,	561.	,, (Digitaria) pruriens, *Tr.* *β*, glabrum, *N. ab E.*
,,	2397.	,, ,, pruriens nonnihil monstrosum.
,,	489.	,, (Setaria) Italicum, *Linn.*
,,	1342.	,, ,, penicillatum, *N. ab E.*
,,	498.	,, procumbens, var. *a* * * * *N. ab E.*
,,	570.	,, colonum, *β*, pseudocolonum, *N. ab E.*
,,	531.	Oplismenus Indicus, *N. ab E.* in Endl. Prodr. Fl. Norfolk.
,,	1668.	Panicum contractum, *N. et W. Arn.*
,,	493.	,, radicans, *Retz*, var. *a* et *β*.
,,	554.	,, pilipes, *N. ab E.*
,,	652.	,, cæsium, *N. ab E.* ined.? colore minus cæsio differt. Paniculæ rami scaberrimi.
,,	553.	,, Kleinianum, *N. ab E.*
,, ,, ,,	1274. 1880. 2409.	,, auritum *β* procerius, *N. ab E.* (*Panicum Javanicum*, N. et Bl. olim.)

,, 2284. 679. Panicum *concinnum*, N. ab E. ined.; virens, paniculæ decompositæ oblongæ ramis erecto-patulis plerisque subverticillatis gracilibus flexuosis brevi spatio fereque a basi divisis inferne compositis apice simplicibus rhachique plus minus villosis, spiculis ($\frac{2}{3}$ lin. longis) ovali-oblongis obtusiusculis in ramulis ramorumque apice simpliciter spicatis glabris nitidulis (ferrugineis), glumis parum inæqualibus brevissime mucronulatis, inferiore paulo breviore ovata trinervi, superiore ovali 5-nervi, flosculo neutro bivalvi, valvula inferiore glumæ superiori conformi obsolete 5-nervi apice puberula, hermaphrodito breviore oblongo obtuso lævi (fulvo), culmo ramoso, inferne sulcato glabro, infra paniculam tereti striato pubescente, vaginis laxis hiantibus foliisque lanceolato-acuminatis basi rotundatis villosulis.

Insulæ Philippinæ. *Cuming, Phil. n.* 2284.

Folia 7–8 poll. longa, 6 lin. lata, subtus subsericantia. *Ligula* hirsuta. *Vaginæ* sæpe solutæ. *Panicula* fere pedalis, erecta, axillis fuscis barbatis.—Differt a *P. notato*, Retz, panicula minore haud patentissima, foliis latioribus villosulis; a *P. Arnottiano* foliis villosulis nec basi subcordatis, ramis paniculæ a basi aut brevi a basi spatio florigeris; a *P. cæsio*, N. ab E., colore viridi.

Cuming. 2287. Hymenachne serrulata, *N. ab E.*

„ 947. Isachne *Myosotis*, N. ab E. ined.; paniculæ parvæ racemosæ compositæ ramis rigidulis 5–2–1-floris, spiculis longiuscule pedicellatis globosis, flosculis scabris æqualibus conformibusque, inferiore hermaphrodito-masculo, superiore fœmineo, glumis patentibus oblongis hispidis, culmis cæspitosis humilibus repentibus adscendentibus ramosis, foliis confertis lanceolatis striatis vaginisque e tuberculis hirsutis.

Insulæ Philippinæ. *Cuming, n.* 947.

Vix bipollicaris, insigni hirsutie distincta, proxima tamen *I. rigidulæ*. *Spiculæ* vix magnitudine seminis papaveris. *Glumæ* flosculos æquantes, patentissimæ.

Cuming. 435. Centotheca lappacea, *Desv.*

„ 550. Cynodon linearis, *Willd.*

„ 1538. Pollinia *Cumingii*, N. ab E. ined.; culmo procumbente (gracili) ramoso, nodis vaginisque foliisque linearibus sessilibus argutissime acuminatis glabris imberbibus, spicis geminis, articulis rhacheos pedicelloque utrinque (rufescenti-) pilosis pilis articulo suo brevioribus, glumis hirsutis apice præmorso-dentatis pallidioribus basi fuscescentibus, seta flosculi fertilis spicula subtriplo longiore.

Insulæ Philippinæ. *Cuming, n.* 1538.

Polliniæ præmorsæ, N. ab E. (Javanic.) confinis, differt charactere adnotato. *Vaginæ* ore et margine glabræ. *Folia* 2 poll. longa, vix lin. 1 lata, 3–5-nervia. *Spiculæ* 1–1¼ lin. longæ; seta flosculi 4 lin. longa; reliquis ut in illa, apicem si excipis albidum glabrescentem.

Cuming. 726. Pogonantherum polystachyum, *R. et Sch.*

„ 555. Rhaphis Javanica, *N. ab E.*

„ 1400. „ *stricta,* N. ab E. ined.; paniculæ lanceolatæ ramis compositis ramulis centrifugo-pleiostachyis, barba brevi strigillosa, pedicellis extrorsum increscenti-barbatis, spiculis accessoriis masculis neutrisve, fertilis spiculæ gluma inferiore scabra apice angusto bidente dorso medio canaliculato-concavo, superiore acuta, seta spicula sua triplo longiore, culmo recto stricto nodisque glabro, foliis linearibus angustis margine scaberrimis culmo brevioribus.

Insulæ Philippinæ. *Cuming, n.* 1400.

Culmus bipedalis, paucinodis. *Folia* culmea 6 poll. longa, 1½ lin. lata, setaceo-acuminata. *Panicula* 6 poll. longa, densa. Rami spatio aliquo a basi nudi, hinc iterato bifidi cum spicula intermedia sessili, adjecta ab altera parte spicula mascula pedicellata. Glumæ albidæ. Proxima *Rh. microstachy.*

Cuming. 980. Rhaphis microstachys, *N. ab E.* var.? Foliis culmo brevioribus holosericeo-scabris setulis exiguis.

„ 569. Sorghum Halepense, β, muticum, *N. ab E.* An propria species? Pedicelli sunt glabri.

„ 1395. „ tropicum, *N. ab E.* β, muticum.

„ 1002. Spodiopogon angustifolius, *Tr.* β, minor, gluma supera sæpe mutica.

„ 1000. Andropogon (Cymbopogon) Martyni, var. α, gluma infera parum marginata, foliis margine valde scabris.

„ 1398. „ (Dactylopogon) sericeus, *R. Br.*

„ 1609. Androscepia gigantea, var. α, *Brongn.*

„ 2431. Anthistiria Junghuhniana, *N. ab E.* *Heterolythron scabrum,* Jungh. in sched.

„ 1673. „ ciliata, β, subglabra, *N. ab E.*

„ 635. Apluda mutica, *Lam.*

„ 1615. Heteropogon Roxburghii, *W. Arn.* *H. polystachyus,* R. et Sch.

„ 1003. „ contortus, *R. et Sch.* totus glaber.

Cuming. 565. Meoschium elegans, *N. et W. Arn.* (paulo imperfectius.)

„ 2430. Ischæmum repens, *Roxb.*

„ 1339. Ophiurus *undatus*, N. ab E. ined.; culmo simplici monostachyo, spica exserta teretiuscula ad latera undatim sulcata, gluma inferiore obtusa obsolete nervosa basi leviter sulcata, flosculo inferiore bivalvi, foliis anguste linearibus uninervibus strictis lævibus.

Insulæ Philippinæ. *Cuming*, *n.* 1339.

Ab *Ophyuro monostachyo*, cui similis, differt gluma obtusa, flosculo inferiore bivalvi et foliis lævibus, tum culmo simplici.

Cuming. 562. Rottboellia exaltata, *Linn.*

„ 1801. 2411. Saccharum *Alopecurus*, N. ab E. ined.; foliis planis margine scabris, paniculæ lanceolatæ densæ ramis tenacibus laxis tenuibus undatis lævibus plerisque verticillatis, rhachi communi lævi sulcata, pedicellis glabris, spicula lana breviore utraque hermaphrodita caduca 1-andra, flosculo neutro univalvi hermaphroditoque bivalvi conformibus membranaceis ciliatis, hermaphroditi valvula inferiore lanceolata ex apice bidente setuligera, seta in aliis brevissima in aliis spicula duplo longiore.

Insulæ Philippinæ. *Cuming*, *n.* 1801 *et* 2411.

Saccharo Saræ simile. Differt inflorescentia candidissima, ramis ejus tenacissimis nec fragilibus pedicellisque glabris, spiculis caducis minoribus (vix 1 lin. longis), pedicellis clavatis, apice delapsa spicula excavata.—*Glumæ* apice caudato-attenuatæ, membranaceo-chartaceæ; inferior 4-nervis, apice bidens.

Cuming. 480. 931. Imperata Kœnigii, *P. de B.*

„ 634. Saccharum semidecumbens, *Roxb.* var. latifolia? Differt a *S. semidecumbente* foliis $1\frac{1}{4}$ poll. latis planis lævibus.

„ 787. 1841. Saccharum *densum*, N. ab E. ined.; foliis linearibus planis apice convoluto-subulatis margine scabris, paniculæ amplæ densissimæ subovales ramis subsimplicibus elongatis plus minus serpentinis tenacibus pedicellisque glabris, rhachi communi striata lævi, spiculis caducis lana brevioribus utraque fertili, glumis chartaceis læviusculis, flosculi hermaphroditi bivalvis ciliati valvula inferiore lanceolata ex apice setigera, seta spicula duplo longiore.

Insulæ Philippinæ. *Cuming*, *n.* 1841 *et* 787 (panicula magis explicata).

A *S. Alopecuro* differt paniculæ multo latioris ramis aliquot pollices longis simplicibus in juventute valde arcuato-flexuosis, qui isti multo breviores et decompositi.

Cuming. 623. Phragmites Roxburghii, *Kunth.*

„ 671. Chætaria *trichodes*, N. ab E. ined.; panicula angusta contracta, ramis capillaribus subfasciculatim decompositis, glumis setaceo-mucronatis scabris, inferiore flosculi stipitem brevissimum subæquante, superiore eodem stipite longiore crasse trinervi, flosculo lineali, arista ad basin fere divisa, lacinia media bilineali lateralibusque linealibus sæpe recurvis scabris, foliis lineari-angustis complicato-setaceis vaginisque striatis.

Insulæ Philippinæ. *Cuming, n.* 671.

Digitalis, cæspitosa, erecta, gracilis.—Similis primo adspectu *Chætariæ capillaceæ,* sed differt *foliis* viridibus nec glaucis, complicatis, vaginis radicalibus latioribus, truncatis, spiculis pallide fuscis nec viridulis, *glumis* nervis 3 fortioribus præditis, superiore flosculos cum stipite brevissimo superante.

Cuming. 2451. Sporobolus elongatus, *R. Br.*

„ 545. „ *verticillatus,* N. ab E. ined.; panicula stricta lanceolata elongata, ramis alternis erecto-patulis basi trifidis densissimeque florentibus brevibus strictiusculis, spiculis exiguis, glumis subovalibus obtusis patentibus parum inæqualibus, inferiore paulo breviore angustioreque, valvulis obtusis sub fructu obovatis scabris, caryopsi obovata biconvexa obtusa lævi rufo-castanea nitente, culmo erecto simplici tereti striato, foliis planis elongatis margine scabris vaginisque glabris.

In insulis Philippinis. *Cuming, n.* 545.

A *S. minutifloro* differt imprimis axi inflorescentiæ stricto et ramis paniculæ ad summum bipollicaribus basi trifidis ibidemque densissime florentibus, quo species verticilli exoritur,—tum glumis parum inæqualibus aliisque.

Cuming. 1101. Pollinia *setifolia,* N. ab E.; spicis pluribus (8–12) subdigitato-confertis, articulis, pedicello utrinque, glumis dorso et margine pilosis ciliatisque, gluma inferiore acute bidentata, superiore longe setigera, flosculo superiore bivalvi, valvula inferiore ex apice setigera, seta spicula (unilineali) multo longiore, culmi nodis subsericeis, foliis convoluto-filiformibus strictis vaginisque glabris.

Insulæ Philippinæ. *Cuming, n.* 1101.

Similis *Polliniæ ciliari*, Tr., differt spiculis duplo minoribus (1 lin. longis) et seta glumæ superioris multo longiore (2-lineari).—*Gluma* inferior dorso late canaliculata.

Cuming. 1399. 1914. Perotis hordeiformis, *N. ab E.*
„ 556. 825. Leptochloa Chinensis, *N. ab E.*
„ 713. Dactyloctenium mucronatum, *Willd.*, var. *a*, Ægyptiacum, *N. ab E.*
„ 696. Chloris barbata, *Sw.*
„ 716. Eleusine Indica, var. β spicis apice abortivis ut in var. γ.
„ 1415. Arundinella (Miliosaccharum) *stricta*, N. ab E. ined.; culmo racemoque strictis angustis glabris, ramis adpressis alternis compositis subsecundis, gluma superiore $\frac{1}{5}$ longiore, flosculo fertili lævi apice longiuscule biseto arista triplo breviore, foliis (culmeis) linearibus convoluto-setaceis adpressis culmo brevioribus vaginisque glabris, ore vaginarum barbato.

Insulæ Philippinæ. *Cuming, n.* 1415.

Statura stricta et macra distinctissima species. *Gluma inferior* 2 lin. longa, subulato-acuminata, quinquenervis, nervis prominulis, lateralibus subcontiguis. *Setulæ* flosculi superioris longitudine dimidiæ fere valvulæ.

Cuming. 1414. Arundinella (Miliosaccharum) *nervosa*, var. γ, simplex, ramis racemi alternis, superioribus longioribus simplicibus, spiculis geminatim distantibus.
„ 667. „ (Acratherum) miliacea, *N. ab E.*, forma minor.
„ 1397. Rhaphis villosula, *N. ab E.*
„ 1224. Triticum vulgare, var. 3, *Metzger.*
„ 714. Eragrostis plumosa, *Linn.*, forma laxa.
„ 1104. „ Zeylanica, *N. ab E.*, minor.
„ 668. „ „ „ var. glomerata.
„ 2420. „ amabilis, *R. Wight.*
„ 1782. „ megastachya, *Linn.* β, patens.
„ 1416. „ Brownii, *N. ab E.*
„ 637. Bambusæ species non determinanda, cum spiculæ desint.

Gardner. 4031. Anachyris *paspaloides*, N. ab E. ined.

GEN. CHAR.—ANACHYRIS, N. ab E. (Oryzeæ. *Post* Leersiam).—*Spiculæ* unifloræ, dorso convexæ. *Glumæ* nullæ. *Valvulæ* duæ, chartaceæ, muticæ, clausæ, subæquales; inferior amplior, acutiuscula, arcte amplectens superiorem, 5-nervis, nervis prominentibus; superior paulo brevior, obtusa, dorso concava, trinervis, marginibus membranaceis dilatatis inflexis genitalia amplectens. *Lodiculæ* . . . *Stamina* 3. *Ovarium* glabrum. *Styli* duo basi connati. *Caryopsis* libera, plano-convexa (ovalis), valvulis clausis tecta.—Inflorescentia. Spiculæ *in rhachibus dilatatis planis acutis secundæ, racemosæ*, pedicellis *brevibus distachyis, hinc spiculæ quadrifariæ.* Racemi *proprii in racemo polystachyo denso dispositi* (18–20) *ad ortum barbati.* Culmus *sesquipedalis, teres, paucinodis*, nodi *glabri.* Vaginæ *laxiusculæ, striatæ, glabræ; inferior aphylla, quæ sequitur microphylla*; folia *media linearia, plana, acuta, supra, præsertim basin versus et margine longis pilis hirsuta.* Ligula *in pilos densos soluta.* Racemus *terminalis exsertus*, 8 *lin. longus, lanceolatus, acutus, contractus.* Rhaches *propriæ mediæ bipollicares, virides, lineares cum acumine.* Spiculæ *confertæ*, $\frac{1}{2}$ *lin. longæ, ovales, apice angustiores, dorso exquisite quinquecostatæ, albæ, rigidulæ, hinc concavæ.* Antheræ *fusco-purpureæ.* Caryopsis $\frac{1}{3}$ *lin. longa, obtusa, asperula, lutea, scutello* $\frac{1}{4}$ *breviore depresso.*

Sp. 1.—Anachyris *paspaloides*, N. ab E. In Brasilia. *Gardner, n.* 4031 *in herb. Lindl.* Habitus *Paspali pyramidalis.*

Gardner. 3503. 3510. Paspalus *Gardnerianus*, N. ab E. ined.; racemis pluribus (2–4) alternis falcatisque basi barbatis, pedicellis hirtis sub spicula barbatis, rhachi plana obtuse carinata undata margine setosa spiculis geminatis latitudine æquali, spiculis oblongo-ovalibus, gluma nulla! valvula neutra (gluma vulgo superiore) tenui puberula trinervi nervo medio obsoleto, foliis culmo stricto multo brevioribus glabris, inferioribus confertis a basi argute acuminatis planis margine cartilagineis strictis, culmeis paucis parvis, vaginis radicalibus basi holosericeis.

In Brasilia. *Gardner, n.* 3503 *et* 3510 *in herb. Lindl.*

Deficiente omnino gluma, quæ sola in *Paspalis* prodit, a reliquis cunctis discedit. Proximus omnino est *Paspalo falcato*, N. ab E., differt autem præterea foliis brevibus planis, infimis circa basin 2 lin. latis, culmo stricto licet gracili (2-pedali), rhachi et pedunculis minus hirsutis. *Spiculæ* ½ lin. longæ, obtusæ. *Valvula* neutra, testacea, ad speciem binervis. *Flosculus* fertilis flavescens, punctulato-asper, ad basin subinde vestigio glumæ seu macula testacea exigua obvio.

Gardner. 3497. Paspalus notatus, *Fl.* var. *β*, maculatus, *N. ab. E.* foliis undique hirsutis.

„ 4032. „ plicatulus, spiculis majoribus, foliis totis glabris.

„ 4033. „ *effusus*, N. ab E. ined.; racemis pluribus (15–20) brevibus distantibus patentissimis alternis mediisve oppositis fasciculatove-verticillatove-ternis, infimis sæpe a vaginis proximis inclusis, rhachi plana margine basin versus ciliata ipsaque basi barbata spiculis laxe quadriseriatis inæqualiter longe pedicellatis paulo latiore, glumis (½ lin. longis) oblongo-ovalibus acutiusculis subtiliter pubescentibus trinervibus (lutescentibus), vaginis fauce barbatis tuberculato-hirsutis laxis, foliis lineari-lanceolatis acuminatis planis supra sparsim pilosis subtus puberulis glabrisve, caule ramosissimo diffuso.

Brasilia. *Gardner, n.* 4033 *in herb. Lindl.*

Affine *Pasp. consperso*, Tr., *eleganti*, Flügge, *malachophyllo*, Tr., et quoad spiculas aliquanto magis etiam *P. paniculato*, sed culmo maximo ramoso longe distat aliisque. *Folia* scabra, 9 poll. longa, 2 lin. lata, mollia. *Spicæ* infimæ circiter 2 poll. longæ, maxime distantes a reliquis et in vaginis foliorum proximorum sæpe latentes; reliquæ circiter pollicares, patentissimæ. *Spiculæ* inæqualiter approximatæ, pedicellis hirtis altero longo altero brevissimo. *Habitus* omnino laxus et flaccidus. *Color* læte viridis.

Gardner. 4045. Paspalus *rectus*, N. ab E. ined.; spica solitaria (an et altera?) recta basi barbata elongata, rhachi trigona dorso convexa glabra spiculis geminatis angustiore, glumis æqualibus oblongis obtusis trinervibus glabris, culmo filiformi recto stricto foliisque erectis subadpressis anguste linearibus glabris, vaginis ore lanatis.

Brasilia. *Gardner, n.* 4045 *in herb. Lindl.*

Simile *Paspalo flaccido*, N. ab E., var. monostachyo, differt glumis æqualibus et spiculis minoribus angustioribus, etc. A *P. Swartziano*, R. et Sch., recedit spiculis majoribus (1 lin.) geminis nec solitariis, et haud ovatis sed oblongis apicem versus parumper latioribus. Nervi glumæ laterales, sæpe purpurascentes, infra apicem glumæ cum nervo medio arcu junguntur.

Gardner. 3544. Panicum (Digitaria) horizontale, *a*, *N. ab E.*
„ 3519. „ (Setaria) sulcatum, *N. ab E.*
„ 3515. „ „ scandens, *Schrad.*
„ 3518. „ „ macrostachyum, *N. ab E.*
„ 3514. „ (Echinolæna) procurrens, *N. ab E.*
„ 3522. Manisuris granularis, *Sw.*
„ 4056. Andropogon (Cymbopogon) trachypus, *Trin.*
„ 3543. Heteropogon contortus, *R. et Sch.*
„ 4394. Leptochloa procera, *N. ab E.*
Hartweg. 521. Andropogon (Anatherus) bicornis, *N. ab E.*

„ 629. Festuca *Toluccensis*, H. et Kth. var. *β*, hephæstophila, N. ab E. ined.; culmo stricto, panicula erecta rigida brevi subdecomposita, ramis brevibus alternis, spiculis subquinquefloris ovali-oblongis, foliis angustissime linearibus setiformibus strictis culmo brevioribus, rhizomate fasciculatim ramoso.—Festuca species nova? F. Toluccensi, H. et Kth. affinis. Benth. pl. Hartweg, p. 97. n. 629. In ipso cratere montis ignivomi, Volcan di Agua dicti. *Hartweg. Vid. in herb. Lindl. spec. Hartweg.*

Differt a forma Humboldtiana statura minore, scil. culmo vix ultra pedali, foliis revera planis, licet angustissimis nervoque valido notatis longitudine dimidii culmi, neque subteretibus flaccidis culmum æquantibus, spiculis nonnihilo minoribus, sed coloris ejusdem, scil. flosculis fusco-purpureis basi axin versus pallidis lævibusque.

Cæterum *Festuca Toluccensis*, *Festucæ duriusculæ*, Linn. (var. *a*, *strictæ*) hac forma intermedia magis etiam accedit, differt tamen spiculis majoribus latioribusque fusco-violaceo alboque variis nitidis, seta flosculorum terminali rufa, valvula sua plus triplo breviori, culmo infra paniculam scaberrimo.—*Folia* radicalia 2–3 poll. longa. Caulinorum *ligula* biaurita! *Rhizoma* profunde descendens, in fasciculos foliorum alios steriles alios culmiferos divisum. *Valvula* superior chartacea, colorata, apice bidentata.

DECADES OF FUNGI; *by the* REV. M. J. BERKELEY, M.A., F.L.S.

Decades XXV. *to* XXX.

(*Continued from p.* 88.)

Sikkim Himalaya Fungi, collected by Dr. J. D. Hooker.

291. *Agaricus* (Psalliota) *exaltatus*, n. s.; pileo amplo sicco fusco-purpurascente subsericeo; stipite exaltato fusiformi radicato, medio cavo, fibrilloso corticato pallido; lamellis latis postice truncatis vel attenuato-rotundatis, e niveo fusco-purpureis. Hook. fil., No. 31, cum ic.

HAB. On clay and earthy banks. Darjeeling, 7,000 feet. May, June. Rare.

Pileus 6 inches across, undulated, at length purple-brown, dry, obscurely silky; flesh thin, except in the centre, loose, purplish-brown just beneath the cuticle. Stem 9 inches high without the rooting base, fusiform, 1½ inch thick in the centre where it has a narrow cavity, covered with a thin, cracking, fibrillose coat. Veil, if present, fugacious. Gills varying greatly in breadth, truncate behind, or attenuated, but rounded, ventricose or broadest in front, not adnate, at first snow-white, at length mushroom-purple. Spores minute, purple-brown, obliquely elliptic.

Fries suspected that *Coprini* would be found on a splendid scale in tropical countries. Later illustrations, whether of the pencil or herbarium, do not prove this, the species of *Coprini* being, generally, either the same with our own, or obscure and uninteresting. The mushroom, on the contrary, assumes every conceivable luxuriance of form. The present is a noble species, and as singular in its characters as it is magnificent. *A. augustus* is the only one of its allies that can compare with it in the development of the stem. The difference exhibited in the gills is remarkable; sometimes they are rounded behind, but attenuated and remote from the stem, as in *A. cretaceus*; sometimes ¾ of an inch broad, and abruptly truncate.

* *A. sylvaticus*, Schæff. Hook fil., No. 61, cum ic.

HAB. On earth. Darjeeling, 7,500 feet. Rare.

Of this I have seen no specimens, but the figure indicates a variety, differing in scarcely any character, except the purple, rather than russet tinge. The decidedly fistulose stem separates it from *A. campestris*.

292. *A.* (Psalliota) *aureo-fulvus*, n. s.; pileo hemisphærico acute umbonato sicco aureo-fulvo, margine squamuloso; stipite elongato flexuoso subtus cum pileo concolore squamuloso sursum pallido; annulo subdistante erecto; lamellis latis affixis atro-rufis margine albis. Hook. fil., No. 127, cum ic.

Hab. On dead wood. Jillapahar, 7–8,000 feet. October. Not common.

Inodorous, firm, rather dry and tough. Pileus 1 inch or more broad, hemispherico-subcampanulate, with an acute umbo, dry, golden-buff, smooth, except towards the edge, which has a few scattered yellow scales. Flesh thin, except in the centre. Stem 3 inches high, scarcely 2 lines thick, tawny below, paler above, flexuous, firm, tawny within, narrowly fistulose, slightly scaly, downy at the base. Ring rather distant, cup-shaped. Gills very broad, plane, affixed, dark brown, with a white margin. Spores elliptic, rather large.

Combining the characters of *A. squamosus* and *A. semiglobatus*. From the former it is distinguished by its very broad gills; from the latter by its umbonate pileus, which is scaly on the margin. From *A. luteo-nitens*, again, it differs in its broad gills, though it agrees in colour and in the squamulose margin.

* *A. sublateritius*, Fr. Ep. Hook. fil., No. 24, cum ic.

Hab. On dead wood. Darjeeling, 8,000 feet. May.

Odour faint, fungous. Pileus rather viscid. Stem spongy, stuffed, at length hollow.

It would be easy from these characters to form a distinct species, but I regard it merely as a form of *A. sublateritius*.

* *A. fascicularis*, Huds. Hook. fil., No. 81, cum ic.

Hab. On dead wood. Darjeeling, 7–8,000 feet. June, July. Abundant everywhere.

293. *A.* (Hypholoma) *macrophalus*, n. s.; pileo e conico subhemisphærico carnoso umbonato glabro, carne sulphurea; stipite fistuloso; lamellis sulphureis distantibus postice rotundatis. Hook. fil., No. 79, cum ic.

Hab. On trunks of trees. Darjeeling, 7–8,000 feet. June, July.

Inodorous, tufted, rather firm and leathery. Pileus 2 inches broad, at first conical, then subhemispherical, broadly umbonate, with the umbo frequently depressed in the centre, dry, yellow shaded with tawny, very fleshy, especially in the centre; flesh yellow. Veil cottony, attached to the margin, hanging down in long ragged shreds. Stem 3 inches high, $\frac{1}{3}$ of an inch thick, fistulose, the hollow running deeply into the substance of the pileus, yellow above, rufous below. Gills rounded behind, distant, sulphur-yellow, stained at length with the spores, which are of a pale ferruginous tint.

Very nearly allied to *A. fascicularis* and *A. sublateritius*, but differing from the former in its more distant, broader gills, and thicker substance, and from the latter in its yellow flesh, decidedly fistulose stem, rounded gills, &c.

* *A. velutinus*, Pers. Syn. p. 409. Hook. fil., No. 70, cum ic.

Hab. On earthy banks. Darjeeling, 7,500 feet. June, July.

The specimens are densely tufted, with precisely the habit of *A. macrourus*, Abbild. d. Schw. No. 3. The pilei are rather campanulate than ovate, but in the coloured flesh and stem they agree with *A. velutinus* rather than with *A. lacrymabundus*. The gills are truly adnate in young specimens. The stem is rather squamose than fibrilloso-striate.

294. *A.* (Hypholoma) *hemisoodes*, n. s.; pileo semiovato subcarnoso fibrilloso fulvo; stipite deorsum crassiore flocculento fistuloso; lamellis latis truncato-adnexis fusco-purpureis. Hook. fil., No. 136, cum ic.

Hab. On earth banks. Darjeeling, 7,600 feet. October.

Inodorous, rather firm. Pileus scarcely 1 inch across, half ovate, dry, rich tawny, silky, slightly fleshy; flesh yellowish beneath the cuticle, then white. Stem 2 inches high, 2 lines thick, rather thicker at the base, tawny, flocculent, whitish at the base, fistulose. Gills broad, between plane and ascending, truncato-adnexed, purple-brown. Spores purple-brown, obliquely ovate, apiculate at either end, but more decidedly so at one extremity.

Allied to *A. lacrymabundus* and *velutinus*, but abundantly distinct in the bright-coloured pileus and broad brown-purple gills.

295. *A.* (Hypholoma) *atrichus*, n. s.; cæspitosus; pileo subhemisphærico obtuse umbonato glabro pallido-luteo; umbone rufo; stipite rufescente deorsum cavo; lamellis angustioribus postice rotundato-liberis atro-purpureis. Hook. fil., No. 35, cum ic.

Hab. On dead timber and soil impregnated with charcoal. Darjeeling, 7–8,000 feet. May.

Odour faint; substance rather firm. Cespitose. Pileus 3 inches or more broad, subhemispherical, with a broad umbo, smooth, dry, pale yellow, with the centre rufous, rather fleshy. Stem 3 inches or more high, $\frac{1}{4}$–$\frac{1}{2}$ an inch thick, nearly equal, reddish-brown, hollow below, but not decidedly fistulose. Gills rather narrow, nearly equal, purple-brown, rounded behind, free; spores minutely echinulate.

Allied to *A. lacrymabundus*, &c., but distinguished by its smooth yellowish pileus, rather narrow bright gills, and its stem being hollow downwards, not fistulose to the apex.

296. *A.* (Hypholoma) *castanophyllus*, n. s.; pileo campanulato carnosulo sicco glabro, margine lacerato; stipite glabro æquali fistuloso; lamellis latis adnatis castaneis. Hook. fil., No. 124, cum ic.

HAB. On the ground. Jillapahar. September. Very rare.

Inodorous. Pileus $2\frac{1}{2}$ inches broad, campanulate, obtuse, pale purplish-brown, yellowish towards the margin, dry, smooth, rather fleshy, but tough; margin lacerated, yellow within. Stem 3 inches high, $\frac{1}{3}$ an inch thick, smooth, of the same colour as the upper part of the pileus, fistulose, rather tawny within, nearly equal. Gills broad, adnate, rather thick, of a rich chestnut brown. Spores broadly elliptic, minutely echinulate.

Allied to *A. velutinus*, but abundantly distinct, and remarkable for its very rich chestnut gills. The spores are larger and more distinctly echinulate, though I find them rough both in European and Indian specimens of *A. velutinus*.

297. *A.* (Hypholoma) *condensus*, n. s.; pileo semiovato obtuso pallide vinoso; stipite elongato flexuoso concolore fistuloso; velo fugacissimo appendiculato; lamellis postice latioribus rotundatis adnexis. Hook. fil., No. 54, cum ic.

HAB. On the ground. Darjeeling. May, June.

Inodorous, densely tufted. Pileus scarcely 1 inch across, half ovate, dry, brittle, pale greyish purple-brown, slightly fleshy; flesh umber-brown. Stem 3–4 inches high, about 2 lines thick, flexuous, of the same colour as the pileus, fistulose. Veil white, attached to the margin of the pileus, very fugacious. Gills reddish-umber, broader behind, rounded. Spores small, smooth, elliptic.

Closely allied to *A. hydrophilus*, but differently formed and coloured, with the gills not ventricose, but arched and broader behind. The habit, also, is very peculiar.

298. *A.* (Psilocybe) *cæspititius*, n. s.; cæspitosus; pileo campanulato-conico apice deplanato spadiceo viscido hygrophano carnoso; stipite deorsum incrassato fibrilloso fistuloso; lamellis angustis adnexis umbrino-albidis. Hook. fil., No. 69, cum ic.

HAB. On clay banks. Darjeeling, 7,500 feet. June, July. Abundant.

Inodorous, fleshy, brittle, semitransparent, densely tufted. Pileus ½ an inch or more broad, conico-campanulate, with the apex flattened, viscid, reddish-brown; flesh umber; margin incurved. Stem stout, 1 inch or more high, 2 lines thick, fibrillose, brownish, fistulose. Gills narrow, adnexed, white, with an umber tinge, dark when dry. Spores pale brown.

Evidently allied to *A. spadiceus*, but distinguished by its viscid, differently-shaped pileus. The spores are so pale that the species, when dry, might easily be considered leucosporous.

299. *A.* (Psathyra) *nassa*, n. s.; fragilis; pileo conico subcarnoso reticulato; stipite flexuoso; lamellis angustis adscendentibus subliberis purpurascentibus. Hook. fil., No. 75, cum ic.

HAB. On dead wood. Darjeeling, 7,000 feet.

Inodorous, brittle. Pileus 2 inches or more across, 1 inch high, conical, subcarnose, at length somewhat plicate, olive-brown, reticulato-rugose; margin without striæ. Stem 2 inches or more high, 2 lines thick, attenuated upwards, white, swollen at the base, fistulose. Gills very narrow, ascending, almost free, purple-brown.

Allied to *A. corrugis*, but differing in the narrow gills and other points.

300. *A.* (Psathyra) *flavo-griseus*, n. s.; pileo membranaceo conico-campanulato primum alutaceo-fulvo demum margine sulcato griseo; stipite gracili flexuoso albo fistuloso; lamellis ex alutaceo purpurascentibus distantibus ventricosis in fundo pilei adnexis. Hook. fil., No. 114–116, cum ic.

HAB. On dead wood, in tufts. Darjeeling, 7–8,000 feet. September, October. Very abundant.

Inodorous, delicate, soft, brittle. Pileus 1 inch or more across, at first ovate, tawny-tan, then conico-campanulate, grey, with the exception of the apex, dry, smooth, membranaceous, sulcate. Stem 2–3 inches high, 1 line thick, smooth, white, flexuous, brittle, fistulose. Gills distant, ascending, rather broad, ventricose, adnexed, at first tan-coloured, then tinged with pale red-brown; margin paler. Spores elliptic, about half as long as in the following species, purple-brown.

A pretty little species, allied to *A. gyroflexus*, but differing in its distant gills and larger size. To others of its section it has but a slight resemblance.

Fungi described in the third Century now completed.

Agaricus *Achimenes*, B. & C.
,, *adelphus*, B.
,, *agglutinatus*, B. & C.
,, *anserinus*, B.
,, *antitypus*, *ib.*
,, *apalosclerus*, *ib.*
,, *aratus*, *ib.*
,, *atrichus*, *ib.*
,, *aureo-fulvus*, *ib.*
,, *Berkeleii*, Hook. fil.
,, *bicrenatus*, *ib.*
,, *Broomeianus*, B.
,, *cæspititius*, *ib.*
,, *camptopus*, *ib.*
,, *castanophyllus*, *ib.*
,, *chrysimyces*, *ib.*
,, *chrysoprasius*, *ib.*
,, *condensus*, *ib.*
,, *cremoriceps*, *ib.*
,, *Curtisii*, *ib.*
,, *cystopus*, *ib.*
,, *deliciolum*, *ib.*
,, *dicupellus*, *ib.*
,, *duplicatus*, *ib.*
,, *eöus*, *ib.*
,, *eriophorus*, *ib.*
,, *exaltatus*, *ib.*
,, *examinans*, *ib.*
,, *flavo-griseus*, *ib.*
,, *Goliathus*, Hook. fil.

Agaricus *hemisoodes*, B.
,, *horrens*, *ib.*
,, *incongruus*, *ib.*
,, *macrophalus*, *ib.*
,, *manipularis*, *ib.*
,, *microsporus*, *ib.*
,, *multicolorus*, *ib.*
,, *myriadeus*, *ib.*
,, *napipes*, Hook. fil.
,, *nassa*, B.
,, *ninguidus*, *ib.*
,, *nubigenus*, *ib.*
,, *omnituens*, *ib.*
,, *palumbinus*, *ib.*
,, *papaveraceus*, *ib.*
,, *podagrosus*, *ib.*
,, *prasius*, *ib.*
,, *raphanipes*, *ib.*
,, *regalis*, *ib.*
,, *rhodellus*, *ib.*
,, *rubiætinctus*, *ib.*
,, *rufatus*, *ib.*
,, *rufo-pictus*, *ib.*
,, *russulinus*, *ib.*
,, *scrupeus*, *ib.*
,, *stillaticius*, *ib.*
,, *Thwaitesii*, Hook. fil.
,, *triplicatus*, *ib.*
,, *undabundus*, B.
,, *ustipes*, *ib.*

Agaricus *verrucarius*, B.
,, *varus*, *ib.*
,, *xanthophyllus*, *ib.*
Arrhytidia *flava*, B. & C.
Boletus *Ananas*, Curt.
Corticium *Léveillianum*, B. & C.
Coryne *gyrocephala*, *ib.*
Favolus *curtipes*, *ib.*
Grandinia *tuberculata*, *ib.*
Guepinia *elegans*, *ib.*
Hydnum *ciliolatum*, *ib.*
,, *pithyophilum*, *ib.*
,, *pulcherrimum*, *ib.*
Hygrophorus *luridus*, *ib.*
,, *mucilagineus*, *ib.*
Irpex *crassus*, *ib.*
,, *mollis*, *ib.*
Kneiffia *candidissima*, *ib.*
Lentinus *Ravenelii*, *ib.*
Lenzites *ungulæformis*, *ib.*
Marasmius *opacus*, *ib.*
,, *pithyophilus*, *ib.*
,, *similis*, *ib.*
,, *spongiosus*, *ib.*
Merulius *incrassatus*, *ib.*
Odontia *albo-miniata*, *ib.*
Phlebia *orbicularis*, *ib.*
Polyporus *Caroliniensis*, *ib.*
,, *chartaceus*, *ib.*
,, *cremor*, *ib.*
,, *cupulæformis*, *ib.*
,, *Curtisii*, B.
,, *fissilis*, B. & C.
,, *palustris*, *ib.*
,, *salmonicolor*, *ib.*
,, *xalapensis*, *ib.*
Radulum *magnoliæ*, *ib.*
Stereum *calyculus*, *ib.*
,, *subpileatum*, *ib.*
Thelephora *pteruloides*, *ib.*

Extracts from the private Letters of Dr. J. D. HOOKER, *written during a Botanical Mission to* INDIA.

DARJEELING TO TONGLO.

(*Continued from p.* 91.)

At present, Darjeeling is not only a sanitarium for Europeans, invalid or on leave, but it is a military depôt, and used as a health-station for the European troops. The opinion which the first class hold as to its eligibility, is proved by the rapid occupation of all accommodation, and demand for more. That of the soldiers varies. One, when questioned, says,—“ It is my salvation, Sir: I could hardly stand, much less walk, when I came up; and here I am, cheerily mounting the hill to cantonments.” I should tell you that these cantonments are on the same hill with Mr. Hodgson's house, and five hundred feet above the station.

Others as bitterly complain of the cold climate and want of amusement. In fact, the malady which each has suffered, or is suffering, is the index to the patient's feelings. Chronic diseases, as said before, and especially liver complaints of long standing, are not benefited by a residence on these hills; though how much worse they might have become in the plains, does not show. I cannot hear that the climate aggravates, but it certainly does not remove them. Whoever is suffering from the debilitating effects of any of the multifarious acute maladies of the plains, finds instant relief, and acquires a stock of health that enables him to resist fresh attacks, under circumstances similar to those which before engendered them.

Natives of the low country, and especially Bengalees, are far from enjoying the climate as Europeans do, being liable to sharp attacks of fever and ague, from which the poorly clad natives are not exempt. It is, however, difficult to estimate the effects of exposure upon the latter people, who sleep on the bare and often damp ground, insufficiently nourished, and adhering, with their characteristic prejudices, to the attire of a torrid climate and a vegetable diet, under skies to which these are least of all adapted.

Above Simonbong, a mountain-path, very little frequented and chiefly used as a route to Nepal, leads to the top of Tonglo. As usual, it always runs along ridges of the mountain, through a deep forest of Oaks, Magnolias, Chestnut, and Wallnut, with the Tree-fern and other plants seen on the ascent from Kursiong, as *Elæocarpus,* and many *Laurineæ.* The enormous white flowers of the epiphytal *Rhododendron* lay in profusion on the ground, and with them the equally large, unexpanded, egg-shaped ones of the white *Magnolia*, exhaling a delicious aromatic fragrance. A large Lamellicorn beetle appears to form a nidus in the latter; for I found the egg-shaped mass, formed by the imbricating thick petals, to be perforated on one side, and a large grub in the centre of the column of pistils, or sometimes, instead, a beetle, that would belong to the old genus *Melolontha,* and which was far too big to have got in by the perforation.

Very heavy rain came on at 3 P.M., which obliged us to seek the insufficient shelter of the trees, where we were presently so soaked that it was necessary to encamp; for which purpose we ascended to a spring, called Simsibong, about 6,000 feet up. The place was too narrow to allow of pitching the tent, but the Lepchas quickly built a broad shed, divided it into compartments for themselves and us, and thatched all with wild plantain leaves and bamboo. A table and two settees, to serve for chairs and beds, were soon supplied; and though our roof leaked a little, we managed to make ourselves tolerably comfortable for the afternoon and night. Towards evening the sky cleared up for a while, affording a glimpse of the snowy mountains through the trees, and of Darjeeling, to the level of which we had scarcely ascended.

It is at this elevation, and a little below, that the climbing parasites are most superb, scaling the loftiest forest-trees as at Kursiong, and throwing their great arms round them. I send you a sketch of one of the largest dimensions, enfolding a tree so huge that I could induce none of my people to ascend it. Since then, Dr. Campbell and myself found the same species at a similar level, nearer Darjeeling, and procured its leaves with some trouble; but I cannot, from these, recognize even the order to which the plant belongs. It is not *Ficus* nor is it a *Leguminous* plant.

After cooking their strange supper, the Lepchas took to their stories and flutes. The tones of the latter are singularly sweet and melodious; and, though no more than a reiterated *too-too,* with now and then a wayward change of key or variation, it is so soft, musical, and sylvan, that one can listen to it long and with pleasure. It seems to harmonize with the solitude of these primeval forests. What a contrast to the hateful tom-toms of the Hindoo of the plains! which used to drive me almost distracted on the Ganges. The instrument is made of bamboo, with four equidistant apertures situated far below the mouth-hole, which, again, is remote from the butt-end.

A thermometer, sunk 2 feet 4 inches in the soil, stood at 62° an hour or two after its being buried, and at 61·7° on the following morning, which is about the mean summer-temperature of Darjeeling.

At night, nothing is audible save the occasional hoot of an owl, and the extraordinary guttural metallic clack of the tree-frog (called *Simook*), totally dissimilar from any other sound I ever heard. Of all organized creatures, I think Frogs have the most unnatural voices. The cries of beasts, birds, or insects, are all more explicable to the senses, and more or less referable to the species or family by the observing naturalist; but allied species of Frog utter tones which do not betray the smallest affinity to each other, and more resemble the concussion of metals or other inorganic substances, than the voluntary exercise of muscles and lungs.*

Early on the following morning we left our shed, and, though the prospects as to weather were gloomy enough, proceeded up the mountain. The road still ascends along a ridge, where the steep clay-banks, now slippery with the rain, are rendered passable by the interlacing roots of trees. At 8,000 feet we arrived at some fine masses of micaceous gneiss, protruding from the ridge, and covered with *Mosses*, *Hepaticæ*, *Ferns*, *Cyrtandreæ*, *Begoniæ*, and especially creeping *Urticeæ*. Such masses occur on the Sinchul and all other hills, and, however large, project so awkwardly, and have so confused and contorted a stratification, and are so split, as to lead to the conclusion that if they present a fair sample of the nucleus of the mountains, the latter must consist of strangely shattered masses of rock, rather than uniformly upheaved strata. Indeed, the constantly sloping faces of the mountains, never broken into precipices, nor exhibiting a flat, are the indices of their being formed of shattered masses upheaved without order or regularity. Were their nucleus a solid mass of stratified rock, it must be inclined, with the rocks cropping out in precipices, somewhere; or horizontal, and presenting level-topped hills; but let the observer look from Darjeeling, over the faces of the hundreds of steep mountains and sharp ridges, and he will nowhere see an approach to a precipice. A landslip exposes angular masses, which retained the earth on the faces of the hills: the courses of the mountain torrent, too, are equally significant;—always rapid, often all but a waterfall,—but never a *boná fide chute* of more than a few feet.

The rocks are scaled by means of the roots of trees, and from their top a good view of the surrounding vegetation is obtained. The trees are *Oaks*, *Michelias*, *Lauri*, *Pyri*, *Pruni*, and the characteristic plants I enumerated as growing on Sinchul. Arborescent *Rhododendrons* here commence,—first the *R. arboreum*, above it a silvery-leaved, white *R. macrophyllum; Vaccinia* of several species, generally subscandent or epiphytal; *Helwingia*, climbing *Araliaceæ*, *Stauntonia*, and various *Rubi*; but here, too, it began to rain violently, and the steepness and slipperiness of the path prevented my paying due attention to the vegetation. At 9,000 feet we entered on a long flat, called "Little Tonglo," covered still with a magnificent forest of *Oaks* and the large-flowered *Magnolia,* and here and there fine trees of *Yew. Kadsura* and *Stauntonia* were very abundant, both climbing lofty trees; and the ground was all but covered with the dwarf *Bamboo,* an elegant species, 6–8 feet high, growing thick and close. An epiphytal Orchideous plant, of extreme beauty, *Cœlogyne Wallichii*? (flowers pale rose, with a yellow labellum) was abundant on the trees, and ascends to nearly 10,000 feet. A curious shrubby *Smilax*? with distichous leaves like the *Box,* is very plentiful, as are two scandent species of the usual form. *Convallariæ* of two species and the *Disporum* are also common, with small trees of *Rhododendron arboreum* (var. *puniceum*) and *barbatum, Olea, Limonia, Ilex,* several species of *Symplocos,* and as many of *Celastrus.* The fragrance of some plants was very grateful, and especially that of *Kadsura,* which in this respect, as well as aromatic taste, glaucous foliage, aspect and habitat, inflorescence and higher points, I would restore to the neighbourhood of *Magnoliaceæ,* from whence Lindley has removed it, on, I think, insufficient, though far from trivial grounds.

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* A very common Tasmanian Frog utters a sound that appears to ring in an underground vaulted chamber beneath the feet.

Since leaving Simsibong, I have not met with a single *Leguminous* plant, nor with a *Grass* (except *Bamboo*); of the latter only one or two species occur at the top of Tonglo; of the former certainly none, except, possibly, the *Parochetus,* which I did not see. I think myself safe in asserting that the latter is the only representative of its Order above 5 or 6,000 feet and below 10,000 on the Sikkim-Himalaya.

A loathsome tick infests the bushes at these elevations, both here and at Darjeeling, and a more odious insect it has never been my misfortune to encounter; it is often as large as the little finger-nail, and manages to bury its proboscis and head, without causing more than very trifling pain. It can only be extracted by pure force, and that is sufficiently painful, its horny lancet being armed on both sides with reversed barbs. I have devised all manner of cunning tortures, chemical and mechanical, some of which, I am sure, must give the insect exquisite pain; but none will induce it to withdraw its hold;—the more you pull, "*the more it won't come.*" I can hardly summon courage to extract one from myself; not because of the suffering, but from an indescribable loathing of the creature, such as is called a "scunnery" in Scotland, as some people have for snakes (in which I do not participate). Indeed, I am childish enough to make my servant keep a constant scrutiny on the exposed parts of my person, when tearing through the infested jungles, and always institute a thorough examination as soon as I get home. To Leeches* I am indifferent now, also *Papsas*, and other wholesome-looking blood-suckers; but in ticks, as in bugs, there is something revolting to me:—the very writing about them makes the flesh creep.

We rested the men, whose sodden burthens pressed heavily on their backs, close by a pool of water, wherein grew a very fine *Carex*, and on its banks a *Chrysosplenium*, some *Urticeæ* and *Cyperaceæ*, with two species of *Ranunculus*. The latter genus does not occur at a lower elevation on these mountains: and these are poor little species, with creeping stems and small yellow flowers. Their appearance was the first symptom of entering the botanical region above that of Darjeeling, where *Ranunculaceæ*, *Cruciferæ*, certain *Leguminosæ*, *Gramineæ*, and *Compositæ* abound upwards towards the snow.

The ascent to the summit was along the bed of a watercourse, now brimming over, but which we were already too wet to heed, the rain continuing to pour down with unabated violence. On the banks grew a creeping *Anagallis*? (like *A. tenella*) and a *Primula*, one or two slender *Carices*, and some other alpine plants.

Tonglo top, which we reached in the afternoon, is a rather broad flat ridge, covered with a low forest vegetation, very swampy in the depressions, where broad pools of water, full of *Iris*, occur. *Rhododendrons* are the prevailing trees, but I have already described them.

The rocks which crop out at the top are all broken masses of gneiss and mica-schist, with garnets. The soil is a deep spongy black vegetable mould; or, where the rock is disintegrated, a gravelly sand; neither appears naturally retentive of moisture, but the constant rains keep both in a state of saturation.

Commencing with the smaller vegetation, *Carex* was the prevailing genus, covering the ground like long grass, of which latter a few tufts only were intermixed. *Anagallis*, and a blue-flowered *Ajuga*? were everywhere mingled with it, and overtopping the blades are two small herbaceous species of *Panax* (is one the *Ginseng*?), two of *Convallaria* (one has whorled leaves and a poisonous root), two *Arums* (one the broad-hooded species of Sinchul top), *Viola*, an *Elaterium*? *Iris*, *Thalictrum*, *Aconitum palmatum*,* *Rheum*, one or two *Ranunculi*, and *Anemone*? *Meconopsis napalensis*, *Geranium*, a dwarf *Hypericum* and various creeping things. *Gentiana* two species, *Crawfurdia*, *Potentilla*, *Epilobium*, *Androsace*, and *Paris*.

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* I cannot but think that the extraordinary abundance of these *Annelides* in all the grazing-grounds of Sikkim, may cause the death of many animals. Some marked instances of murrain have followed very wet seasons, when Leeches swarm in unusual numbers; and the disease in the cattle, described to me by the Lepchas, and which chiefly affects the stomach, differs in no respect from what these creatures would produce. It is a well-known fact that Leeches have lived for days in the fauces, nares, and stomach of the human subject, causing always dreadful suffering, and in the last case death. I have seen cattle feeding where they were so numerous, that fifty or sixty have attacked my ankles at one time.

BOTANICAL INFORMATION.

Notices, hitherto unpublished, concerning JOHANN CHRISTIAN DANIEL VON SCHREBER. *From* ERINNERUNGEN AUS MEINEM NEUNZIGJÆHRIGEN LEBEN (*Reminiscences of my Ninety Years' Life*). *By* DR. ERNST WILHELM MARTIUS, *formerly Apothecary to the Court and University of Erlangen.* Leipzig, 1847. 8vo. Translated by N. WALLICH, M. et Ph. D., F.R.S., V.P.L.S.

[THE subject of these pages, a man of very great celebrity and universal estimation as a botanist and zoologist, has enriched the science of natural history with works of his own, of sterling and enduring value, as well as with editions of the works of others. Among the latter are the 'Amœnitates Academicæ' and 'Genera Plantarum' of Linnæus, of whom he was one of the most distinguished pupils. To the 'Amœnitates' he added three posthumous volumes; and I am very happy to be able, through the kind indulgence of the President of the Linnæan Society, to add, at the end of these *Notices*, the copy of a letter from Schreber to Dr. Dryander relating to that work. In the valuable edition of the 'Genera,' he performed, among others, the laborious, but praiseworthy task, of giving classical names, in accordance with the laws laid down by the author himself—the immortal Linnæus—to the insufferably barbarous and arbitrary nomenclature of the otherwise most valuable work of Fusée Aublet. None but those who have long toiled in India, and are not wholly unacquainted with its languages, can form an adequate idea of the awful mistakes, which are too frequently committed with regard to vernacular names, either fabricated for the nonce, and therefore totally false, or wofully mis-spelt, and still further mutilated by being latinized.

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* One of the plants whose roots are used indiscriminately by the natives, for poisoning their arrows; the others are another *Aconite* (not *ferox*) and a *Composite*. The poison is rubbed on, with the juice of a *Pothos*.

With respect to the 'Erinnerungen,' I may be permitted to remark, that it is a work full of interest from its first page to the last, extending over a truly Hectorean lifetime, and is written in a peculiarly easy and agreeable style. The amiable and venerable author, as he had lived, so did he gently and peacefully "fall on sleep," on the 12th December, 1849, in his ninety-second year. The translation has been made from p. 143 to 151 consecutively; a few extracts have also been made from other parts of the work. Finally, these notices were read before the meeting of the Linnæan Society, held on the 19th February, 1850, chiefly to occupy a little spare time which happened to offer itself.—N. W.]

Schreber had been professor in the Medical Faculty of the University of Erlangen since the year 1769, and took, therefore, deservedly the lead among naturalists there. His deportment was grave, measured, and aristocratic. On the 23rd December, 1791, he succeeded Delius as President of the Imperial Academy Naturæ Curiosorum: an honour to which he had an undoubted claim, as a pupil of the great Linnæus, as a man of extensive science, and as a productive and sterling author. His multifarious knowledge rendered him peculiarly valuable to a university in which one and the same professor had to teach several sciences. Schreber was accordingly attached to two faculties. In that of medicine, he gave demonstrations in botany, physiology, dietetics, and materia alimentaria; whilst, in the philosophical faculty, he had to deliver lectures on rural economy, technology, political economy, and even on polity. He was deeply versed in astronomy, and pursued with much zeal the researches of Schröter; he was master of the Greek and Hebrew languages, and wrote Latin with classical elegance. Notwithstanding this profound erudition, he never became a popular teacher. In his lectures he mostly confined himself to his compendious manuscript, from which he read, illustrating his subject by an occasional exhibition of some object of nature, or by a few brief observations. It was evidently his anxious care not to expose any vulnerable points in his doctrine, whereby he might compromise himself; and least of all would he suffer himself to be ensnared into any sort of discussion, which might demand an exhibition of his scientific views and doctrines. His academical auditors were thus kept at a respectful distance from him. It was only upon occasions when mention was made of his illustrious master, or of the Linnæan school at Upsala, which he had attended, that he became animated, and would relax into a communicative mood; he would then relate many interesting anecdotes, especially during the extensive botanical excursions he used to make about Erlangen in former years. So far back as 1760, he had attained the degree of Doctor of Medicine at Upsala, the great northern metropolis of the muses; and this was the most luminous point of his life; for when the conversation happened to turn in that direction, the otherwise reserved, didactic, and taciturn Schreber, would become all of a sudden cheerful and eloquent. I should probably, as a younger man, have remained at a distance from him all my days, partly out of respect for his great knowledge, and partly also in deference to his aristocratic character, had he not, on the demise of Prof. Delius, succeeded to the chemical chair in the university; and death, which mostly breaks up connections, seemed in this instance to bring me into immediate contact with Schreber. Although he possessed an extensive theoretical knowledge in the science of chemistry, and always availed himself of the most approved authors in it, he had never troubled himself about the operative or practical part. He had a dread of mineral acids; and I will be bound to say, he had never in his life handled a crucible or retort. In this state of things his chemical lectures were begun, and with them my practical duties as his assistant. My father-in-law* had, besides myself and another assistant, two apprentices, so that I was enabled to undertake my new office without detriment to our business.

Schreber's course of lectures was often very instructive; but, unfortunately, his preparation for the requisite experiments did not always keep equal pace with these, owing to his extreme anxiety and want of decision, which stood in the way of his making timely provisions. On my calling on him he would say, "We are to boil soap to-day." It was in vain that I explained that, not having had previous notice, all I could do was to make use of some solution of caustic alkali I had in store. No, *nothing* would do but we must needs sift ashes and procure quicklime,—the consequence of which was that the lecture hour (11 o'clock) passed away. Mishaps of this sort were of frequent occurrence, in which his auditors and my spectators were obliged to amuse themselves, as well as they might, with whatever sights were in the immediate vicinity of the laboratory, the professor in the meanwhile exercising, and the experimenter demanding, all manner of patience. Two racoons which the Aulic-Counsellor Schöpf had brought from America, and were kept within a grating in a back-yard, afforded great amusement to the students on such occasions. Most of these carried with them a sort of bludgeon in those days, called a "Ziegenhainer" (a cant term), even when attending lectures. If the beast perchance stretched out a paw, it was sure to be saluted with a blow, when the professor, attracted by the roaring of the animal, would approach in breathless haste and desire that the "poor little animal might not be intruded upon." Although he had agreed to give me weekly notice of all the apparatus and experiments required for the next eight days, I could never make him adhere to this arrangement. However, I gained one point, which was, to be put in exclusive possession of the laboratory, which he, accordingly, had but seldom to visit,—a state of things seemingly not a little agreeable to himself; for coals and fire were not among his favourites, besides which the short working-frock became very ill his tall and emaciated form, and was his peculiar aversion. Both of us endeavoured as much as possible to accommodate ourselves to the existing state of the chemical science, and succeeded in bringing the principal phenomena in the doctrines of Priestley, Scheele, and Lavoisier before the students during the annual course. Nor were we deficient in the more practical kinds of experiments, although we sometimes failed, when they were dictated by some one-sided theory. For instance, I was to make glass out of the dried common brake, *Pteris aquilina*. The ashes were exposed, in a crucible, to the intense heat of a blast-furnace, which served to cake them together in a slight degree; but, as to glass, none was produced, so that the art of Neri gained no addition from our experiments. I was desired once to treat a sick dormouse with oxygen gas, which, in those days, was promising wonders in the curative art, from its influence on animal life. Unfortunately, the true panacea had not been administered to the "poor little creature," which, accordingly, went the way of all flesh.

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* Mr. E. W. Weinl, in whose dispensary our author was employed at the time, and who was also his uncle.—N. W.

Schreber entertained an extraordinary fondness towards the animals which he kept. I had brought him, from Regensburg, a remarkably tame squirrel, of a curious ash-grey colour. It suffered, in its advanced age, from retention of urine, which we treated scientifically with liquor kali acetici. A lively little American squirrel, which was running about in a closet adjoining the study, took it into its head to amuse its solitary hours by exercising its teeth on the polished surfaces of a handsome cupboard. The article of furniture had already lost its polish as well as its corners, when I was called into aid to chase the ill manners out of the hairy hermit. I proposed besmearing the cupboard with a saturated solution of aloes, hoping that the beast would be kept away by the bitterness. But it turned out, that instead of gnawing, it now amused itself with licking; for one morning I was anxiously conducted to the darling little animal—it had got a violent diarrhœa. I recommended an emulsion of almonds; the professor, an enema mucilaginosum. Mr. Aulic-Counsellor Schreber, and his chemical assistant Martius, were now seen administering emulsion and clysters to the poor animal. If any of these nurslings happened to bite his finger, he would say, "Ah! the poor little creature has stuck by its teeth."

I had thus the honour to come in close contact with this distinguished naturalist, who was otherwise so inaccessible, and whose intercourse with his own colleagues even was very limited. His household was extremely cleanly, simple, tasteful, quiet, and recluse. His wife, born Schönfeld, from Saxony, was a fine, talented, very gentle and amiable lady. They had no children. He occupied a room on the second floor which no one durst enter except his wife. Here Dutch cleanliness and pedantic regularity dominated. Every article had its specific place. His writing-table was kept with as much neatness as the toilet-table of a lady of quality. I think I can trace these peculiarities even to his fine, regular and sharp writing, in which the characters arrange themselves in rigid array. Close to the study was his rich and well-arranged library. On the first floor was his herbarium; in a separate room his other collections in natural history. Only few mortals were permitted to enter these sanctuaries: he watched over them with a solicitude not to be described.

His connections in the East and West Indies, on which he spent considerable sums of money, gave a great value to his collections; these were purchased after his death, for the Academy, by the royal Bavarian Government, for 12,786 florins. His turn of mind and earlier events in life brought him into communication with the Moravians; and some maintain that he actually belonged to this sect. He received, in consequence, many contributions from the Danish West India Islands, from Tranquebar, Labrador, and Greenland. The collections made in North America by his friend and pupil Aulic-Counsellor Schöpf, surgeon to the Baruthan troops, then in English pay, came, at the death of the owner, into his possession; as did also, afterwards, those of the celebrated Schmidel. Neither cost nor trouble were spared to procure materials for his 'Natural History of Quadrupeds.' This work was commenced in the year 1775; and the means accumulated for this work, through his extensive connections, were considered as extremely valuable. Not being able to publish the descriptions with the same rapidity as the plates were issued, he got into difficulties with his publisher, and also with the public, which were sometimes very perplexing to him. It was one of the leading works of its kind at the time. My valued friend Goldfuss, of Bonn, undertook afterwards, for a time, the continuation of the work. By a curious accident it got subsequently into the hands of my younger son Theodor, and his friend Mr. Pauli, a merchant. Prof. Andrew Wagner, of Munich, finally conducted the work to its conclusion; and two of the gentlemen I have named, have the merit of having completed that which Schreber had begun seventy-one years before, by the aid of Walther, the bookseller. It is well known that Schreber showed his veneration towards Linnæus by an edition of the 'Amœnitates Academicæ' (Erlangæ, 1785), in 10 vols. 8vo. His secluded mode of living and unceasing activity, avoiding all social enjoyments, enabled him not only to produce so much of his own, but to assist in the production of works of other authors, *e. g.*, the edition of the 'Flora Indiæ Occidentalis' of his friend Olaf Swartz, of Stockholm.

At Upsala he had formed a friendship with the younger Burman, who, with Sir Jos. Banks, Sir J. E. Smith, and Solander in England, and Pallas and Georgi in Russia, became afterwards his correspondents. With several others, among them Schrank, Schæffer, and Roth, Schreber was elected an original honorary member of the newly established Royal Botanical Society at Regensburg. This society, which owed its origin to Hoppe, Stallknecht, and our author, held its first meeting on the 30th October, 1790. Dr. Martius was the secretary ; and at present, after a lapse of sixty years, his illustrious eldest son, Professor von Martius of Munich, is the president (p. 121). Our author dedicated to Schreber, as a mark of sincere respect, a work he published in 1795, 'Mineralogische Wanderungen,' &c. (Mineralogical journeys through part of Franconia and Thuringia, in letters addressed to a friend),—which compliment Schreber did not acknowledge, except in a very distant manner ; a circumstance attributable, our author thinks, to his having visited and published the localities of several rare plants among Schreber's favourites, in the vicinity of Muggendorf, which, in a fit of jealousy, he wished to keep to himself (p. 171). Notwithstanding all this, the President honoured Martius by visiting him several times in company with the great Werner, for the purpose of inspecting his valuable mineralogical collection. Both these *savans* placed themselves comfortably near the drawers of my cabinet, which I exhibited with due parental fondness. Werner would contemplate the specimens with minute attention before giving an opinion, which was never dictatorial, but, on the contrary, modest and diffident ; a reserve which invariably attends a really great mind, while the reverse of it is characteristic of the superficial pretender. In the breast of Schreber this reserve was carried to an extreme ; and it may be easily imagined that the two *Coryphæi* kept clear of all arguments, and exhibited marked proofs of their discretion and caution. But there was this great difference between them—a calm conviction on the part of the one, and a nervous conscientiousness on the part of the other. Originality was the leading feature of Werner ; the talent of gathering and accumulating stores of knowledge, that of Schreber. Both these qualities of mind are highly respectable—for genius and talents are alike the gifts of God ; but it is their especial development which forms the individual character of the man of science (p. 171).

Those among his disciples whom he distinguished with his confidence, received at his hands every possible aid and encouragement, as for example Schweigger, subsequently professor at Königsberg, who prepared a flora of Erlangen under his direction. I regret that my eldest son had only the advantage of a short period in which to benefit under him ; but Schreber was well-disposed, and sent him occasionally out to botanize, in order to collect plants which he wished to describe in 'Sturm's Flora.' To all these great and excellent points must be added his praiseworthy charity towards the poor; and if there were, indeed, some shadowy points in his character, they are attributable, in a degree, to some literary selfishness, which made him a little jealous of the merits of those around him. My dear friend Esper, among others, experienced the effect of this failing. Again, it was not without an effort, that he could persuade himself to return specimens which had been confided to him for his examination. I was, myself, once in the unpleasant predicament to act on an occasion of this nature, in behalf of my literary friend Meyer, apothecary to the court at Stettin; nor was it until threatened with legal proceedings that the Surinam herbariums, which had been lent to Schreber, could be recovered. It was Schreber who originated the Botanic Garden at the "Nürnberger Thor," enriching it with numerous additions, which his zealous correspondents supplied. But his botanical gardener, Rümmelein, had constantly to complain of the oddity and obstinacy of Mr. President; and occasionally relieved himself from so onerous a surveillance, by distributing, behind the back of the director, specimens of many a rare plant among the students, who repaid him, not simply by admiring the beautiful flowers, but by presents in hard cash. In his capacity of professor of natural history he had all the collections in that department under his charge. The museum was above the anatomical theatre, where Schreber gave his lectures. None but distinguished foreigners had ever access to this sanctuary. Now, in order to make the museum available for his lectures, Schreber had recourse to the pounder in my dispensary, whom he employed to convey the specimens required into the theatre (these lectures, too, were delivered in the forenoon at 11 o'clock). But this troublesome business, and the awkwardness of Mr. President, caused much breakage. After the lecture, the subjects had to be taken upstairs again; on which occasion the professor kept an anxious watch at the entrance to the museum. One of my assistants, Gaupp of Kaufbeuern, whom I had afterwards to instruct in the *ars amandi*, to qualify him to become proprietor of the Star Dispensary at Nürnberg, got it into his head, from curiosity or thirst after knowledge, to try his luck, by availing himself of the moment when the specimens were carried back. Gaupp was standing modestly, his hands folded on his back, at the folding-door of the museum, admiring the curious array of natural rarities. Suddenly the President came up to him: "It is twelve o'clock; your soup might get cold," he said, and slammed the door upon him. Disconcerted, Gaupp hurried home and mentioned the whole affair at dinner, observing that, after all, "Mr. President Schreber was not a very polished man."

Schreber enjoyed an extraordinary degree of importance in all the town of Erlangen and its vicinity; and when he appeared in the street, which rarely happened, he was saluted with much respect, which compliment he returned with ducal gravity. I saw him for the last time on the 2nd November, 1810, when he passed my house wrapped in his ample scarlet cloak, lined with white fox's skin. He was soon after seized with a catarrh on his chest, from which he died with Christian resignation on the 10th December following.

The subjoined exact copy of Schreber's letter to Dryander, mentioned above (p.113), is inserted here by permission of R. Brown, Esq., President of the Linnæan Society.

Excellentissimo et experientissimo
D. D. JONÆ DRYANDRO,
S. p. d. D. Jo. Christ. Dan. Schreber, Med. et Bot. P.P.O., &c.

Tres elapsi sunt anni, ex quo Illustrissimo Banksio aliquas Dissertationes, quas ab Illo desiderari, a cel. Fabricio, Prof. Kilon. intellexeram, et Tom. VIII. & IX. Amœnitatum Academicarum b. Præceptoris Linnei, a me editos, quorum priorem Viro Illustrissimo dedicaveram, misi. Nondum vero comperi, an hi libelli in Ejus manus pervenerunt, nec ne? Quare, quum Te, Vir Excellentissime! Illustrissimi Banksii familiaritate frui sciam, omni qua par est observantia abs Te mihi expeto, ut non solum hac de re me certiorem facere velis, sed etiam, num editionis reliquorum tomorum novæ, quam paro, exemplar, quod pro bibliotheca Viri Illustriss. in charta belgica imprimi curavi, Ipsi offerre mihi liceat? edocere. Quatuor jam prodierunt, reliqui proxime sequentur.

Benevolentiæ Tuæ commendo Virum Generosissimum, a quo has literas accipies, Baronem Berenger de Beaufain, Sereniss. Domui Saxon. a Consiliis intimis, ejusque filium, optimæ spei adolescentem. Mihi ipsi vero quoque favorem Tuum etiam atque etiam expeto, et ut sic de me habeas, rogo, me, qui Te Tuaque merita permagni facio, Tibi, et Illustrissimo Banksio, ad quæcumque officiorum genera semper futurum esse paratissimum. Vale. Dab. Erlangæ, die 14 Aug., 1788.

Fitch, lith.
Reeve Benham & Reeve, imp.

NOTICES OF BOOKS.

Specimens of the FLORA *of* SOUTH AFRICA. By a Lady. Atlas folio. London. 1850.

THIS is truly an *ouvrage de luxe*; and since "it does not profess to be of a strictly scientific character," it would, perhaps, beautiful as it is, have passed unnoticed in our Botanical Journal, but that it has come forth under the auspices of Dr. Wallich, and the descriptive part with the aid of Dr. Harvey. As a specimen of art, we may observe that the subjects are the most choice that a South African vegetation (celebrated for its variety and charms) can exhibit. The drawings are all made on the spot by a lady* of high talent and accomplishment in the art of drawing and colouring; the plates are executed by the eminent lithographer, Mr. P. Gauci; the paper is made expressly for the work; and nothing can well exceed the whole style and finish of the publication.

The title-page is a picture in itself,—a wreath, tastefully enclosing the engraved title, of the most charming kinds of Amaryllidaceous, Irideous, and Orchideous plants, *Oxalis*, &c.,—the colours mingled with the best possible effect. The volume is dedicated, and justly so, to the excellent Wallich, "under whose flattering encouragement and scientific guidance this collection of plants was delineated;" and, in the brief preface, due acknowledgments are made both to Dr. Wallich and to Dr. Harvey, and an assurance given that "it will be a source of much gratification to the authoress, if she is enabled to impart, in some degree, to others, the pleasure she has derived from the study of the beautiful flowers of Southern Africa."

The first Plate is devoted to the graceful *Sparaxis pendula*; and this affords opportunity for Dr. Harvey to offer remarks on the *Irideæ*, generally, of the Cape Colony,—one of the most characteristic features of the vegetation of Southern Africa. The family, we are told, "has its maximum at the Cape of Good Hope; and in the months of the spring and early summer of the southern hemisphere—namely, from

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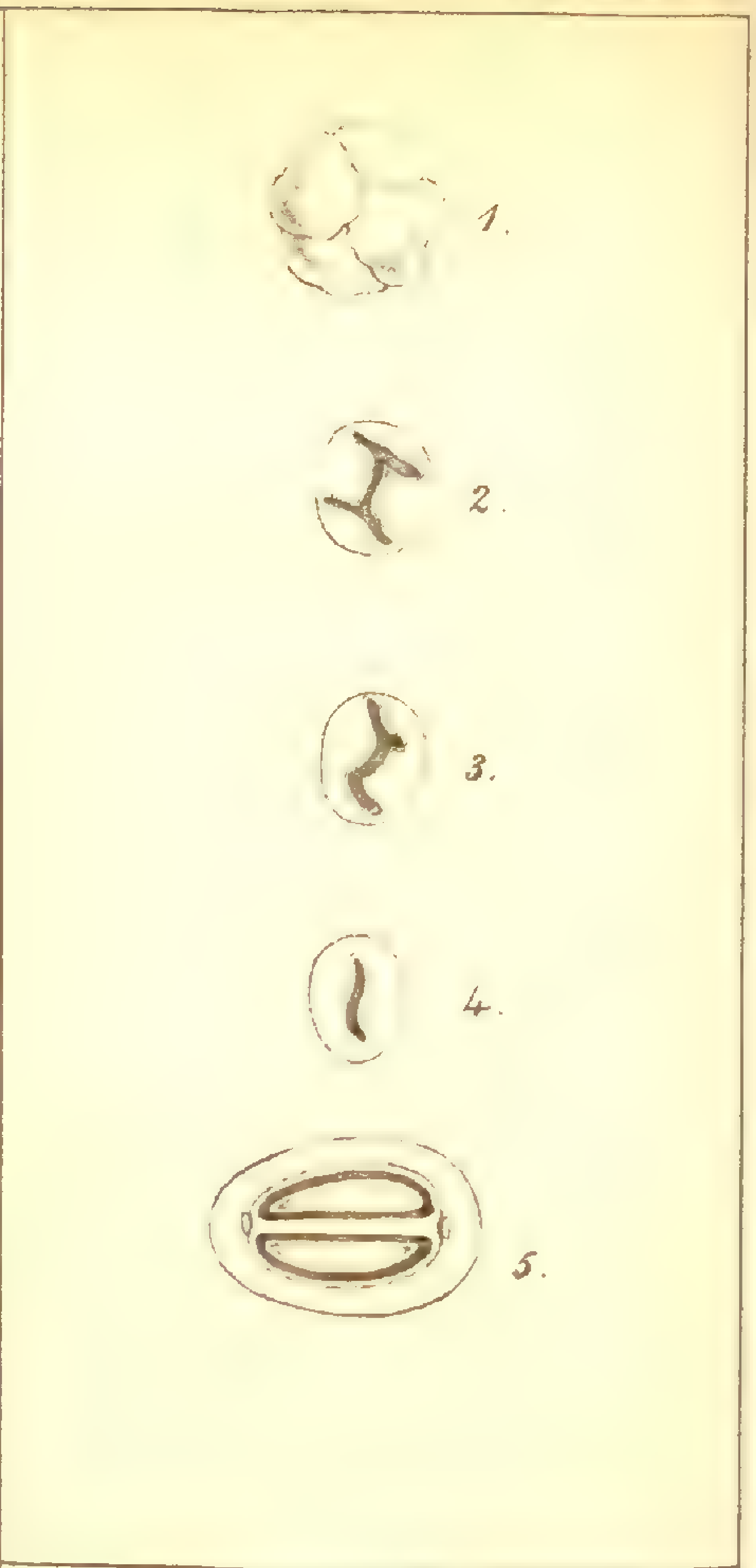
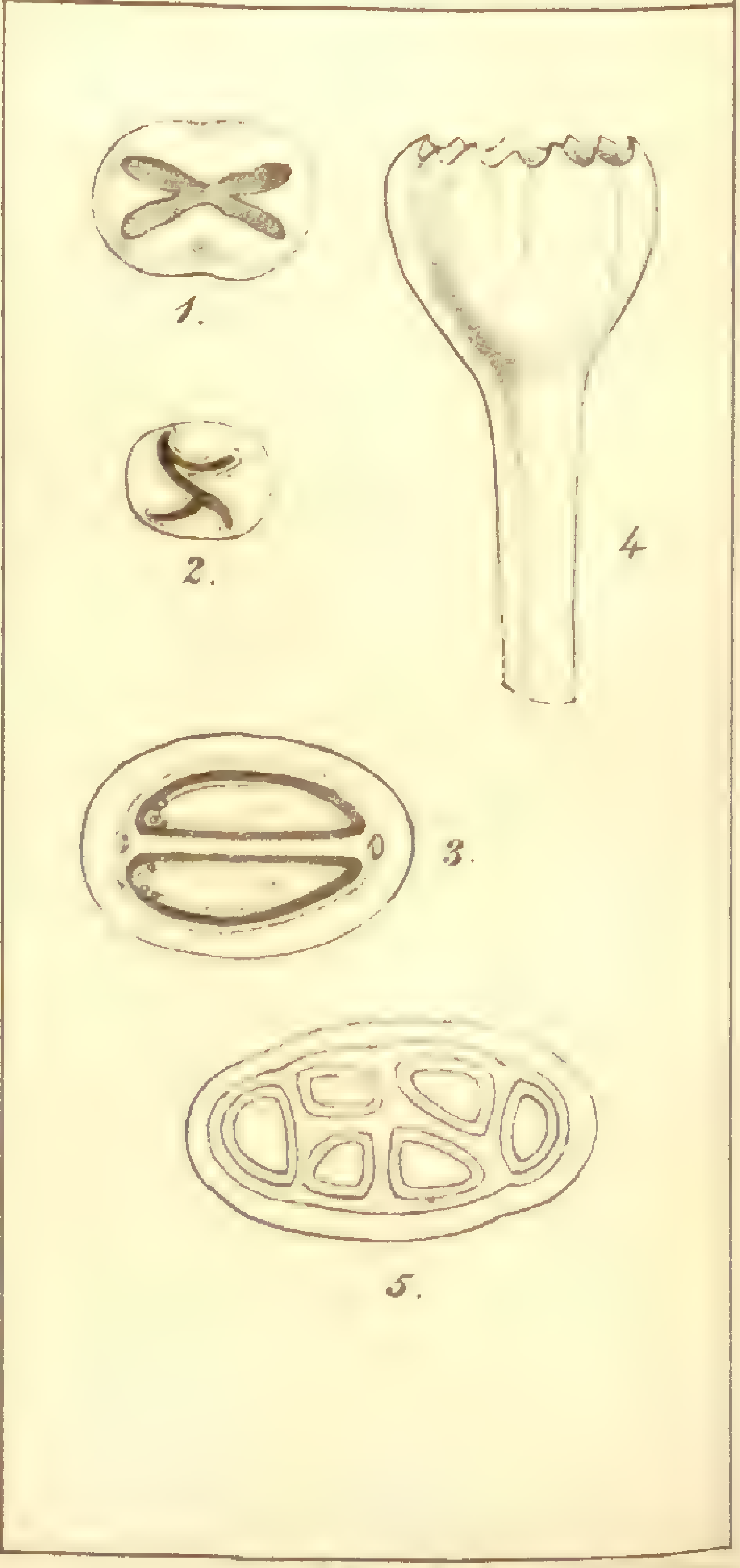
* The name is modestly withheld throughout the whole of the work; but on the authority of the 'Botanical Magazine,' under *Roupellia grata* (vol. lxxiv. tab. 4466), we are enabled to say that these admirable drawings are the work of the Lady of Thomas Boone Roupell, Esq., a gentleman now high in the Civil Service of the East India Company, on the Madras Establishment.

September to November—the face of the country glitters with the blossoms of these beautiful bulbs. Countless species of *Ixia*, of *Gladiolus*, of *Watsonia*, of *Babiana*, of *Sparaxis*, and many other genera of this family, spring up one after another as the season advances, until the hills and meadows are painted with rainbow colours:—the *Ixia*, orange, pink, and white; the *Watsonia*, rose-coloured; *Babiana* and *Aristea*, blue; and *Gladiolus* and *Sparaxis*, tinted with every shade of colour, diversify the picture; while *Hesperantha* (the *Avond-bloomjie* of the colonists), opening her pale flowers late in the evening, perfumes the air with her delicious aroma, like that of the night-blowing Stock." Plate II. exhibits a groupe of *Irideæ*. Each separate kind is noticed in a popular, yet not unscientific, manner, and additional remarks on the family are given. From these we learn that the bulbs of most of the Ixias are eatable, and regularly brought to market: they contain a large amount of starch, and, when boiled or roasted and served as chestnuts, are not unpalatable. Plate III. A groupe of *Sparaxis*, with further and exceedingly interesting observations on the *Irideæ*, especially concerning their endurance of drought and heat, and the magic change which a few days' rain or even a heavy thunder-storm effects upon the vegetation in the *Karroo*, where "from the burnt soil start up, almost with the rapidity of Jonah's gourd, flowers of the most glowing tint, and foliage of the tenderest green." This groupe is particularly splendid in the colours. Plate IV. *Liparia sericea*, which gives occasion for Dr. Harvey's excellent observations on the *Leguminosæ* of South Africa. This is an admirable plate. Plate V. The noble *Brunsvigia multiflora*, of the Amaryllideous family, here discussed, and of which above one hundred species have been discovered in this part of the world. Plate VI. *Leucospermum* and *Protea*, with observations on the Proteaceous family, so abundant in South Africa and in Australia. Plate VII. represents the truly magnificent *Protea mellifera*; and a charming description is given, full of interest to the philosopher and to the lover of nature. Plate VIII. *Protea cynaroides*, in bud, the bud half open, and the fully expanded head of flowers.—This terminates the volume, save the figure of *Roupellia grata*, *Wall. and Hook.*, forming a vignette at the close of the last page;—an African plant (the *cream-fruit* of the colonists of Sierra Leone), and eminently deserving of bearing the name of a family which, in this and in other ways, have rendered service to science and to mankind.





Fitch lith.

Reeve Benham & Reeve imp.

On the Structure of the OVARY *of* MARLEA *and affinities of* ALANGIEÆ ;

by BENJAMIN CLARKE, Esq. (Pl. V.)

As it remains hitherto a question whether the ovary of the genus *Marlea* be one- or two-celled, the fine specimen of *M. begonifolia* growing at Kew, which recently produced an abundance of flowers, offered a favourable opportunity of examining the structure of the ovary; and the circumstance of De Candolle having originally described the fruit of the Order *Alangieæ* as one-celled, so differing from *Myrtaceæ*, gave an additional interest to the inquiry, as being connected with the affinities of the Order.

The result of observations, made with much care, has been, that the ovary of *Marlea* is very rarely one-celled, much less frequently than the ovaries of certain plants which are generally regarded as two-celled, for example *Circæa alpina*. The stigma, indeed, of *M. begonifolia* is constantly four-lobed (Vide Pl. V. A. f. 1), which would lead to the expectation that the ovary was compound, such stigmas not unfrequently indicating four carpels, or two having bifid stigmas. The latter I conclude to be the explanation of the structure in the present instance; for on tracing the dorsal ribs of the ovaries up through the style into the stigma (taking the oblong form of the diameter of the canal as a guide), it was uniformly found that they corresponded in position, not with either of its lobes, but with two opposite fissures (Vide Pl. V. A. f. 3, 4, 5, 6, 7 and 8). Thus the stigmas of *M. begonifolia* may be considered as bearing some resemblance to those of a *Begonia*, in common with the leaves, its stigmas being less deeply divided and combined to a greater extent.

Another remarkable circumstance connected with the structure of the ovary of *M. begonifolia* is that a canal exists in the style, which is continued into the thickened disc, and there divides into two lesser canals which diverge and enter the cells of the ovary, passing over the funiculi (Vide Pl. V. A. f. 2). The canal and its branches are quite pervious throughout, from the stigmas to the cells of the ovary; and this may, perhaps, serve to explain a peculiarity of the nucleus of the fruit of *Alangieæ*, viz., that it has a foramen at its apex.

A structure so uncommon as that of the stigmas of *Marlea*, among epigynous plants, may doubtless, to a certain extent, be employed as one of the characters by which to determine the affinity of the Order

Alangieæ; and among hermaphrodite epigynous Orders that have been compared with this Order, this bifid stigma exists only in a part of the Order *Cornaceæ,* among which the stigma of *Cornus alba* may be considered analogous to those of *Marlea.* As in *Marlea,* there are four lobes, the lobes being more united; an open canal extends through the style down into the disc, though it does not enter the ovary; and the position of the cells of the ovary being compared with that of the lobes of the stigma, they are found to correspond with the fissures of the stigma, nearly, though not so precisely, as in *Marlea.* The cells are, however, constantly opposite the two angles in the canal at the base of the style, which are continued from two opposite fissures in the stigma, the other two having become obsolete as in *Marlea* (Vide Pl. V. B. f. 1, 2, 3, 4 and 5).

But in *Cornus sanguinea* the cells of the ovary are opposite two lobes of the stigma, which are, moreover, unequal (Vide Pl. V. C. f. 1); yet the similarity between this species and *C. alba* is such, that the structure can hardly be thought to differ; and that it is the same as *C. alba,* is rendered probable by the internal processes which descend from the lesser lobes of the stigma, not disappearing in the style below (as when stigmas represent abortive carpels), but increasing so as to overlap each other (Vide Pl. V. C. f. 1, 2 and 3). This imbrication of opposite lobes does not take place in *Marlea* and in *C. alba,* they only lie in contact (Vide Pl. V. B. f. 2), which may be sufficient to account for the cells of the ovary of *C. sanguinea* not having the same relation to the lobes of the stigma as in *C. alba.* The number also of the lobes of the stigma of *C. sanguinea* is generally double the number of the carpels, or nearly so, when there is an increase of carpels in the ovary; thus, an ovary having four cells had a stigma with eight or nine lobes, and another with six cells had a stigma with eleven lobes (Vide Pl. V. C. f. 4 and 5).

Another indication of the affinity existing between *Marlea* and *Cornus,* and also between *Alangium* and *Cornus,* is furnished by the changes which occur in the structure of *Cornus sanguinea.* I have found, when cultivated in a nursery, the number of petals and stamens frequently increased to 5, 6, 7, or more, the greatest increase observed being 8 petals and 10 stamens, the ovary of the flower being four-celled; the carpels, however, sometimes increase to 7, without any further increase of the petals and stamens. Thus the numbers of the parts of the flower in these instances are quite equivalent to those of *Marlea begonifolia*, where the numbers are 5, 6, and 7, the usual number being 6.

That a tendency also exists to an increase of carpels in *Marlea*, is shown by an occasional increase taking place even when growing in confined circumstances: in one instance there were two additional imperfect cells separating the original cells, and in another, three fully-formed fertile carpels (Vide Pl. V. A. f. 9). And it is not improbable that *Alangium* has the same tendency; Rheede, in 'Hort. Malabar.,' having described an *Alangium* with a fruit containing 2 or 3 nuclei, the same species being figured as having a stigma of a triangular form.

The comparison of *Marlea* to *Cornus* may be extended also to the ovules, which are placed in the same manner in the cells of the ovary, viz., the raphe is not next the placenta or axis of the ovary as in pendulous anatropal ovules generally, but is always situated laterally (Vide Pl. V. A. f. 8 *a*, and C. f. 3 *a*). In *Cornus*, this gives a peculiar form to the cell, causing it to be rounded on one side and somewhat angular on the other, and this becomes more apparent as growth advances.

In discussing the affinities of dicarpellary Orders, there remains another character which should not be overlooked, and that is, the position of the carpels relatively to the axis; and in this also *Marlea* corresponds more nearly with *Cornaceæ* than with any of the Orders which are regarded as nearly allied to *Alangieæ*. Thus, of 51 ovaries of *M. begonifolia*, the carpels were anterior and posterior in 29, and right and left in 22; and of the same number of *C. sanguinea* the carpels were anterior and posterior in 37, and right and left in 14, carpels having an oblique relation to the axis occurring also in both; while in two genera of *Hamamelideæ*, three of *Myrtaceæ*, and one of *Onagrariæ*, all the carpels are anterior and posterior, and in a *Brunia*, having but one carpel, all anterior.

In *Combretum* the single carpel varies in its relation to the axis, being indifferently anterior, posterior, or lateral, which seems to indicate that, if dicarpellary, it would correspond with *Marlea* and *Cornus*, which is rendered in some degree probable by the single carpel of *Aucuba*, among *Cornaceæ*, varying in its relation to the axis nearly in the same manner as that of *Combretum*; but the valvate corolla and albuminous seeds of *Marlea* clearly separate it. *Begonia* also, when the carpels are reduced to two, which frequently occurs in *B. ramentacea*, agrees with *Marlea* in this character (the greater number, however, being right and left), and in its dichotomous inflorescence; and, possibly, *Alangieæ* form one of the nearest approaches of the epigynous hermaphrodite Orders to *Begoniaceæ*.

And, finally, opposite leaves—a character inconstant in *Myrtaceæ* and *Combretaceæ*—is not without exception in *Cornaceæ*, which still further approximates *Alangieæ* and *Cornaceæ*: it appears, therefore, necessarily to follow that these two Orders are most nearly allied; and, in fact, there is but little left to distinguish them, *Marlea* differing from *Cornus* more in its adnate anthers and more leaf-like cotyledons than in any other parts of its structure.

Explanation of the Figures of PLATE V.

A. Fig. 1. The style and stigma of *Marlea begonifolia*; fig. 2, perpendicular section of the ovary, the ovules being left entire; fig. 3, upper surface of the stigma; figs. 4, 5, 6, and 7, transverse sections of the style; fig. 5, of its middle; fig. 7, of its base; and figs. 4 and 6, at intermediate distances; fig. 8, section of the ovary, showing the relation of the cells to the cavity in the style and to the stigmas:—*all much magnified.*

B. Fig. 1. The upper surface of the stigma of *Cornus alba*; figs. 2, 3, and 4, sections of the style; fig. 3, of its middle; fig. 4, of its base; fig. 5, section of the ovary, showing the relation of the cells to the stigma and fissure in the style:—*all much magnified.*

C. Fig. 1. The upper surface of the stigma of *Cornus sanguinea*; fig. 2, section of its style; fig. 3, section of the ovary, showing the relation of the cells to the lobes of the stigma and style:—*all much magnified.*

Contributions to the Botany of WESTERN INDIA ;

by N. A. DALZELL, Esq., M.A.

(*Continued from p.* 41.)

RUBIACEÆ.

Pavetta *siphonantha.* Foliis membranaceis elliptico-oblongis repente acuminatis in petiolum brevem attenuatis, stipulis connatis mucronatis intus pilosis, corymbis axillaribus terminalibusque, corollæ tubo longissimo, laciniis oblongis obtusis tubo quadruplo brevioribus, calycis laciniis parvis acutis reflexis.

This species is distinguished by the very long tube of the corolla (1½ inch), and the very long slender style, which is more than twice the length of the corolla, and terminates in a fine point. The leaves are 6–8 inches long, 2½–3 broad, thin and membranous, with a very fine acumen. The whole plant turns black in drying.

HAB. Parpoolee Ghaut ; *fl.* May.

2. Psychotria *longifolia.* Fruticosa, erecta, glabra, foliis linearibus basi in petiolum attenuatis apice obtuse acuminatis, stipulis bidentatis in tubum vaginantem connatis, inflorescentia terminali paniculæformi trichotoma, bracteis sub ramificationibus parvis dentatis, fructus ?

This species is readily recognized by its long linear leaves, ten inches to a foot in length, and but one inch in breadth. The stipules are like those of *P.* ? *vaginans*, the inflorescence like that of *P. ambigua.* The anthers are linear, obtuse, exserted, and longer than their filaments. Stigma included. The tube of the corolla is quite glabrous internally, and three times longer than the segments of the limb, which are fleshy. The flower-bud is straight.

HAB. In Canara ; *fl.* April.

3. Hedyotis (Anotis) *latifolia.* Caule erecto glabro tetragono fere tetraptero trichotomo, foliis ovatis apice acutis basi rotundatis breve petiolatis, in nervis subtus prominentibus hispidulis supra læte viridibus subtus glaucis 1½ poll. longis 1 poll. latis, stipulis inferioribus truncatis glabris superioribus 3–6 setis ciliatis præditis, floribus in pedunculis trichotomo-ramosis tetragonis longiusculis terminalibus et extra-axillaribus paucis minutis pallide roseis, in-

terdum trichotomiæ ramo tertio in florem solitarium breve pedicellatum redacto, calycis tubo semiovato apice 4-dentato, dentibus triangularibus, corollæ tubo cylindrico dentibus calycinis 3–4-plo longiore, limbi segmentis tubo paulo brevioribus, *fauce pilosa,* capsula puberula vel glabra compressa subdidyma dentibus calycinis medium versus cincta supra a calyce libera basi usque dehiscente 4–12-sperma, seminibus circa placentam sphæroideam stipitatam glomeratis cupuliformibus.

HAB. Provincia Malwan; *fl.* July.

In all the specimens with puberulous capsules, I find but two seeds in each cell; in those specimens which have glabrous capsules, 4–6 in each cell; and, what is singular, the two seeds in the former are equal in size to all the six in the latter. The flowers are fetid, though not so much so as in the following species. The stalk of the placenta proceeds from the base of the fruit, immediately under the dissepiment, and this appears to be the case throughout the *Anotis* section. The affinities of this plant are evidently with *H. Rheedii*; but the corolla is not glabrous, nor are the leaves ever acuminated at the base.

4. Hedyotis (Anotis) *fœtida.* 4-pollicaris, herbacea, erecta, glabra, parce ramosa, ramis oppositis, caulibus acute tetragonis, foliis linearibus marginibus recurvis supra papilloso-scabridis 1 poll. longis 2 lin. latis setis stipularum utrinque 4–5, floribus in pedunculis longiusculis binis vel ternis caulem ramosque terminantibus capitato-congestis geminis ternis v. quinis, calycis quadrifidi laciniis ex ovato-triangularibus acutis calloso-mucronatis setaceo-marginatis basi utrinque dentibus filiformibus accessoriis minutis præditis corollæ tubo 3-plo brevioribus, corollæ purpureæ segmentis ovatis acutis papillosis *æstivatione valvatis* tubo cylindrico dimidio brevioribus, fauce pilosa, capsula valde compressa semiorbiculari papillosa segmentis calycinis distantibus coronata, loculis 2–6-spermis, seminibus circa placentam sphæricam stipitatam aggregatis scutelliformibus, capsula intra calycem tantum dehiscente.

It is unaccountable to me that it has been given as a generic character of *Hedyotis*—"segments of corolla imbricated in æstivation;"—in all the species I have examined, the æstivation is decidedly *valvate*: I speak more particularly of the *Anotis* section, to which this species also belongs. Flowers purple, very fetid.

HAB. Provincia Malwan.

5. Hedyotis (Anotis) *carnosa.* Herbacea, ramosissima, adscendens, glabra, foliis lanceolato-ellipticis obtusis basi in petiolum brevem attenuatis crassis carnosis marginibus recurvis supra papilloso-scabridis subtus pallidis nervis obscuris 1 poll. longis 5–6 lin. latis, pedunculis folio longioribus trichotomis, floribus quinis capitato-congestis capitulis bracteis foliosis suffultis.—Flores fructusque omnino ut in *H. fœtida*, sed planta multo robustior, et folia crassa, carnosa, 3-plo latiora.

HAB. In littore saxoso, prov. Malwan. An varietas maritima?

6. Hedyotis (Anotis Euraphe) *lancifolia.* Herbacea, erecta, ramosa, ramis strictis glabris, foliis lanceolatis acuminatis supra et in nervis subtus pubescentibus 3-pollicaribus basi in petiolum semipollicarem attenuatis, stipulis pubescentibus utrinque setis ciliatis 4–5 vaginarum longitudine præditis, pedunculis patenti-hirsutulis tetragonis longiusculis trichotomis, floribus capitato-congestis quinis numerosis, segmentis calycinis breviter hispidis e lata basi acuminatis parvis, corollæ infundibuliformis tubo gracillimo intus glabro segmenta calycina 6–7-plo excedente, laciniis tubo 3-plo brevioribus extus hispidis, filamentis exsertis, stylo incluso, capsula hispidula compressa dentibus calycinis patentibus coronata apice intra calycem glabra ibique tantum dehiscente, loculis 2–3-spermis. — Semina cupuliformia, circa placentam stipitatam glomerata.—Crescit in montibus Syhadree prope Phonda Ghaut; *fl.* Sept.

This, in general appearance, is very like *H. latifolia*, but is readily distinguished by the very long slender tube of the corolla in this species, the differently-shaped leaves, and by the calyx wholly covering the fruit, with the exception of the space on the summit, where the dehiscence takes place. It is distinguished from all in its section by its erect habit: the flowers are purple, and much more numerous than in *H. latifolia.*

GENTIANEÆ.

1. Ophelia (Agathotes) *multiflora.* Caule tetragono tetraptero densifolio adscendente, foliis rotundato-ovatis amplexicaulibus 5-nerviis (nervis 2 exterioribus minus prominentibus) mucronulatis decussatis æqualibus glabris, cymis fastigiatis multifloris, calycis laciniis lanceolatis acuminatis margine minute serrulatis corolla $\frac{1}{3}$ brevioribus, corollæ 4-partitæ albæ segmentis ovato-ellipticis mucronulatis

foveis orbiculatis fimbriis longis liberis papillosis cinctis, filamentis subulatis ima basi connatis.

Corolla 5 lin. longa.—Crescit in montibus Syhadree ad ped. alt. 4,000, lat. 19°.

2. Canscora *decurrens*. Caule erecto late tetraptero, ramis oppositis et alternis, foliis decurrentibus inferioribus oblongis basin versus attenuatis superioribus ovatis vel lanceolatis acutis, floribus centralibus deficientibus, calyce exalato, corolla parva pallide rosea interdum alba.

Herba gracilis, stricta, sesquipedalis. Folia tenera, membranacea, 3-nervia, caulis angulos secus internodii per totam longitudinem decurrentia, inferiora fere bipollicaria, ½–1 poll. lata, superiora parva, valde acuta. Calyx 3 lin. longus, dentibus (½ lin.) subulatis sinu lato. Corollæ segmenta oblonga, obtusa, tubo breviora. Stigma bilamellatum ; lamellæ magnæ ovatæ obtusæ ; pedicelli tetragoni, 7 lin. longi.—Crescit in oryzetis ; *fl.* Oct. et Nov.

3. Canscora *pauciflora*. Caule erecto tetraptero parum ramoso, foliis parvis, inferioribus ovatis obtusis, superioribus oblongis acutis, omnibus sessilibus 3-nerviis supra margine scabridis, panicula laxa pauciflora, floribus longe pedicellatis solitariis, pedicellis tetrapteris apicem versus incrassatis, foliis floralibus minutis bracteæformibus, stylo exserto staminibus multo longiore corollam æquante.

Calycis dentes subulati, 1 lin. longi, laciniis corollinis dimidio breviores, tubus jugis alatis duodecim instructus, jugis ternis ; corollæ laciniæ oblongæ, obtusæ, tubum æquantes. Folia 5–6 lin. longa, 2–3 lin. lata.—Crescit in graminosis provinciæ Malwan ; *fl.* Sept.

4. Limnanthemum *aurantiacum*. Umbellis axillaribus, foliis parvis orbiculatis basi profunde cordatis obscure palmatinerviis supra nitidis subtus glanduloso-punctatis purpureis, calycis laciniis lanceolatis corolla duplo brevioribus, corollæ tubo intus glabro, segmentis cuneatis apice late et profunde emarginatis margine fimbriatis basi transverse plumoso-barbatis eglandulosis, antheris in fauce subsessilibus, loculis basi sagittato-divaricatis, stylo brevi crasso, stigmate bilamellato, lamellis digitato-plurilobatis, capsula ovata obtusa calyce longiore 12-sperma, seminibus lenticularibus muricatis.

Corolla aurantiaca, 4–5 lin. longa.—Crescit prope Malwan ; *fl.* Sept.

5. Mitrasacme *pusilla*. Caule 3–4-unciali erecto simpliciter ramoso glabro obtuse quadrangulari, foliis lineari-subulatis acutis glabris

carnosulis aveniis 2 lin. longis semilineam latis, pedicellis axillaribus solitariis vel geminis folio 2–3-plo longioribus papillosis, calyce ad medium 4-fido, lobis lanceolatis acutis, corollæ albæ tubo calycem paulo superante, limbi segmentis oblongis obtusiusculis tubo brevioribus, fauce pilosa, staminibus prope basin tubi insertis inclusis stylum basi bifidum æquantibus, antheris flavis apiculatis basi cordatis *subextrorsis*, stigmate capitato integro, capsula globosa glabra calyce paulo breviore.

Corolla semilineam longa.—Crescit in prov. Malwan ; *fl.* Aug. et Sept.

6. Slevogtia *maritima* (mihi) ; glabra, caule adscendente simplici tetragono, foliis oppositis subsessilibus lanceolato-oblongis obtusis trinervibus approximatis, calycis *bracteati* lobis obtusis capsula longioribus, floribus in axillis oppositis ternis sessilibus.

Caulis herbaceus, a basi foliosus, pedalis. *Folia* decussata, glauca, carnosula, deflexa, repente in petiolum brevissimum angustata, 1–2 poll. longa, 6–12 lin. lata. *Calyx* basi *bracteatus*, campanulato-tubulosus, 1½ lin. longus, ad medium 5-fidus, lobis obtusissimis carnosulis, albo-marginatis. *Corolla* alba, tubo exserto intus viridi, limbi lobis oblongis obtusis tubo dimidio brevioribus. *Filamenta* in sacci minuti, corollæ medio tubo adfixi, margine anteriore inserta, antheris breviora, basi dilatata, ibique appendice squamæformi aucta ; inter filamenta *dentes nulli*. *Antheræ* tota longitudine dehiscentes, apice apiculatæ. *Stigma* discoideo-capitatum. *Bracteæ* sub calyce singulæ, laciniis calycinis breviores. *Capsula* intra calycem oblonga, valvarum *marginibus introflexis* seminiferis.—Crescit prope littus in provinciâ Viziadroog.

This differs slightly from the character of the genus ; is it not rather a species of *Enicostema* ? The plant is very rare.

Nat. Ord. ACANTHACEÆ.

1. Cryptophragmium *latifolium* ; suffruticosum glabrum, spicis axillaribus brevibus (2–2½ poll.) trichotomis, foliis longissime petiolatis subrotundato-ovatis acuminatis basi truncatis crenulatis, capsula calyce quadruplo longiore.

Caulis 3-pedalis, strictus, quadrangularis, tuberculis parvis exasperatus. *Folia* ampla, inferiora cum petiolo laminam subæquante, 11–12 poll. longa, 4–4½ poll. lata, basi truncata. *Bracteæ* bracteolæ calycisque 2 lin. longæ ; laciniæ subulatæ, glabræ. *Flores* non vidi. *Capsula* 7½–8 lin. longa, columnaris, quadrisulca, glabra, loculis a basi 12-spermis.—Crescit in ripis "Sheravati," prov. Mysore; fructum maturum habet mens. Aprilis.

2. Lepidagathis *grandiflora*; caule erecto suffruticoso quadrangulari glabro, foliis integris ovatis acuminatis glabris in petiolum bipollicarem attenuatis utraque pagina densissime lineolatis, spicis axillaribus et terminalibus simplicibus vel trifidis longis gracilibus dense lanatis, bracteis bracteolis calycisque lacinia superiore obtusis conformibus trinervibus reticulato-venosis lanatis, calycis lacinia inferiore bipartita, segmentis lineari-lanceolatis, laciniis duabus lateralibus subulatis, corolla profunde bilabiata, labio superiore bifido inferiore amplo trifido, palato convexo transversim plicato medio canaliculato lineis duabus pilosis longitudinaliter decurrentibus, antheris ciliatis basi divergentibus, stigmate acuto, capsula calyce paulo longiore subpollicari 4-sperma, seminibus 2 inferioribus abortivis superioribus compressis, testa fusca pilosa.—Crescit in montibus Syhadree, lat. 16–19°; *fl.* Dec.

A species remarkable not only for its size (5–6 ft.), but also for its large and showy flowers, an inch and a half in length, of a purple colour, with two rows of bright yellow hairs down the centre of the lower lip; the leaves are 1 foot long and 4 inches broad. The flowers turn black in drying.

3. Lepidagathis *prostrata*; caule fruticoso repente radicante flexuoso obtuse tetragono glabro, ramis junioribus molliter tomentosis, foliis parvis sessilibus oppositis interdum ternis ellipticis spinoso-mucronatis junioribus utrinque tomentosis, bracteis bracteolis calycisque 5-partiti laciniis lanceolatis spinoso-mucronatis, spicis raro axillaribus, frequentius in ramis brevibus adscendentibus terminalibus simplicibus.

Frutex rigidus, diffusus, a basi ramosus, *rami* bipedales, *ramuli* crebri, breves, adscendentes, apice floriferi. *Folia* 7 lin. longa, 5 lin. lata, approximata, paucinervia, rigida. *Spicæ* erectæ, bipollicares, pilis glanduliferis velutino-tomentosæ. *Calycis laciniæ* posterior et anteriores 3-nerviæ, laterales 1-nerviæ. Corollæ roseæ 7-linearis tubus basi ventricosus, medio constrictus; faux inflata et intus transversim colore intensiore striata; *labium* superius latum, breviter bidentatum, inferius 3-lobatum, lobis angustis obtusis distantibus. *Antheræ* ciliatæ. *Stigma* obtusum.—Crescit in rupibus nudis prov. Malwan.

Most nearly allied to *L. spinosa*. It is upon this species that I have

found the finest specimens of *Striga orobanchioides*, with large rose-coloured flowers, certainly very unlike the figure of that plant in Hook. Comp. Bot. Mag.

4. Lepidagathis *lutea* ; caulibus crebris erectis filiformibus e basi dichotomo-ramosis velutino-tomentosis, foliis linearibus complicatis trinerviis supra minute patenti-hispidulis subtus glabris, spicis circa radicem glomeratis pilis glanduliferis velutino-tomentosis, bracteis ovato-orbiculatis longissime cuspidato-mucronatis, bracteolis oblique obovatis inæquilateris spinoso-mucronatis, calycis sericeo-tomentosi laciniis anterioribus et posteriore rhombeo-cuneatis spinoso-acuminatis lateralibus linearibus.

Folia bipollicaria, fere 2 lin. lata, non scabra. *Bracteæ* 1–1½ poll. longæ ; *bracteolæ* 6–7 lin. longæ. *Corolla* lutea, 8-linearis ; tubus longiuscule exsertus, basi gracilis medio replicatus ; *labium* superius parvum, brevissime bidentatum, inferius trilobatum, lobis latis obtusis reticulato-venosis, palato intus lineis 2 pilosis instructo. *Antheræ* ciliatæ. *Stigma* obtusum.—Crescit in rupibus nudis provinciæ Malwan ; *fl.* Nov.

Evidently allied to *L. rupestris*, and differing from that species in the bracts and bracteoles being of different forms, and the stem and leaves not scabrous ; the leaves are strictly linear.

5. Asystasia *violacea* ; caule adscendente geniculato glaberrimo obtuse quadrangulari striato, duobus lateribus oppositis sulcatis, foliis ovatis vel oblongis acutis integris inferioribus in petiolum attenuatis superioribus basi rotundatis breve petiolatis v. subsessilibus, utraque pagina hirtulis raro subglabris, racemis terminalibus secundis solitariis vel geminis, calycis laciniis lineari-lanceolatis acutiusculis hirtulis sub anthesi patentibus, pedicellis brevissimis tribracteatis, corolla cærulea pollicari extus glandulosa laciniis omnibus revolutis, labii inferioris lacinia intermedia convexa intense violacea fauce inflata purpureo-maculata, tubo medio valde constricto, capsula glandulosa clavata longe unguiculata 15 lin. longa.—Crescit in utroque Concano ; *fl.* Julio.

Folia 5 poll. longa, 2½ lata. *Stigma* bifidum, lobulis emarginatis.

This appears most nearly allied to *A. Neesiana*. The flowers are about half the size of *A. Coromandeliana*, and are not so symmetrical or *Ruellia*-like in form ; they might be called subpersonate, from the prominence and convexity of the lower lip.

6. Neuracanthus *sphærostachyus* ; e radice perenni caulibus plurimis erectis simplicibus obtuse quadrangularibus pubescenti-scabris, foliis oppositis oblongis basi truncatis vel subcordatis apice obtusis utrinque pubescenti-scabris subtus pallidis, spicis in axillis oppositis sessilibus capitato-congestis globosis dense sericeo-tomentosis post anthesin valde crescentibus, bracteis orbiculatis repente acuminatis coloratis 5–7-nerviis reticulato-venosis calyce paulo longioribus, calycis labio superiore oblongo 3-dentato 3-nervio inferiore profunde bifido laciniis lanceolatis 1-nerviis omnibus reticulato-venosis, corollæ tubo gracili cylindrico calycem æquante, limbo integro ventricoso rotato-cyathiformi.—Neuracanthus sphærostachyus, Dalz. in Hook. Plant. ined. cum Ic.

Caules 1½–2 pedes alti, inferne interdum verrucosi. *Folia* 4 poll. longa, 2 poll. lata, duriuscula. *Spicæ* singulæ, turbinatæ, 6–12 lin. longæ. *Bracteæ* et *calyces* floriferi 3 lin., fructiferi 9–12 lin., longi, capsulam includentes, omnes utrinque sericeo-tomentosi. *Corolla* 6 lin. longa ; tubo albo, limbo cæruleo ; *Antheræ, Stigma, Capsula*, &c. *omnino* ut in *N. tetragonostachyus.*—Crescit in utroque Concano; *fl.* Sept.

Although the limb of this singular plant is entire, it is very evidently made up of five pieces, not exactly by the union of their margins, but by the interjection, as it were, of triangular pieces, so as to unite the opposite margins. Each of the five pieces is indicated by parallel veins and lines of hairs on the back. Each piece has three veins, there being six close together in the upper part of the limb, and two lines of hairs indicating the two parts of an upper lip : the same marks are visible on the lower side of the limb, at greater distances from each other, indicating three divisions, the middle one being furnished with a line of hairs both outside and inside. The æstivation is decidedly plicate, and not contorted.

7. Rhynchoglossum *scabrum* ; caule tereti herbaceo scabro, foliis oblique ovatis acutis integris penninerviis alternis petiolatis pagina superiore nervisque subtus scabridis, floribus in racemum longum terminalem dispositis secundis alternis nutantibus, pedicellis bractea filiformi obtusa brevioribus, corollæ labio inferiore subintegro apice triangulari acutiusculo tubo duplo longiore.

Folia cum petiolo pollicari 4 poll. longa, 16 lin. lata. *Calyx* campanulato-tubulosus, pentapterus, ala suprema basi in cristam obtusam expansa. *Calycis laciniæ* tubo paulo breviores, anguste triangulares, vix acutæ. *Corollæ tubus* calyce paulo longior; *labium* superius, breve, erectum, ovato-rotundatum, integrum vel eroso-denticulatum, inferius 4-plo longius, dente intermedio amplo triangulari, lateralibus minutis vel obsoletis. *Antheræ* 4, *omnes fertiles*, uniloculares, rotundato-cordatæ, rima transversali in facie media dehiscentes, omnes sub anthesi inter se cohærentes. *Capsula* ovata, acuta, glabra, inclusa. *Semina* horizontalia, anguste ovato-oblonga, acuta, longitudinaliter striata.—Crescit in umbrosis prope "Warree," Concano australi; *fl.* mens. Aug.

The discovery of this species, which I made this year, will slightly alter the generic character of *Rhynchoglossum.* We have here, also, the *Rh. obliquum.*

Genus CHLOROPHYTUM.

1. C. *parviflorum*; 8–10-pollicare glabrum, e radice fibrosa tuberibus oblongis pendulis, foliis radicalibus erectis gramineo-linearibus complicatis striatis scapo longioribus, scapo simplici paucifloro, floribus solitariis vel interdum geminis bracteis acuminatis suffultis, filamentis alternatim paulo brevioribus glabris, antheris viridibus, pedicellis medio articulatis fructiferis nutantibus, ovarii loculis 4-ovulatis, capsula acute lobato-triangulari, seminibus in quolibet loculo 2–4 compressis reniformibus minute mammillato-scabris.—Crescit in saxosis prope mare, provinciæ Malwan; *fl.* Julio.

2. C. *breviscapum*; e radice fibrosa tuberibus oblongis pendulis, foliis radicalibus planis ensiformibus (marginibus undulatis) apice acuminatis basin versus attenuatis striatis supra nitidis subtus pallidis scapo tereti simplici vel rarissime ramoso subduplo longioribus, floribus bracteatis geminis confertim racemosis, sepalis oblongis acutis omnibus sub anthesi reflexis, pedunculis apice articulatis, stylo adscendente staminibusque æquilongis, antheris linearibus, filamentis papillosis apicem versus incrassatis, stigmate simplici stylo haud crassiore, ovarii loculis 6–7-ovulatis, capsula triquetra in quoque loculo seminibus 1–3 compressis, testa atra subtilissime papillosa.

Folia 12–14 poll. longa, 1–1½ poll. lata. *Scapus* 6–8 poll. longus, simplex.—Crescit in prov. Malwan; *fl.* Julio.

3. C. *anthericoideum*; bipedale, radicibus plurimis tuberosis, foliis radicalibus ensiformibus subcomplicatis marginibus undulatis scapo

nudo simpliciter racemoso brevioribus, scapi ramis 2–3 brevissimis, floribus solitariis vel geminis, pedicellis semipollicaribus prope basin articulatis, filamentis vesiculis minutissimis papillosis, ovulis in loculis 10 biserialibus, capsula triquetra, in quoque loculo seminibus 5–6 compressis reniformibus, testa atra subtilissime papillosa.

Quoad habitum *Antherico tuberoso* simillimum.—Crescit in prov. Malwan; *fl.* Julio.

4. C. *Nimmonii*; radice tuberosa, foliis radicalibus planis late lanceolatis basin versus longe attenuatis utrinque nitidis striatis scapo tereti simpliciter ramoso bracteato brevioribus, scapi ramis ex axillis bractearum vaginantium longis compressis vel angulatis indivisis, floribus bracteatis geminis cernuis distantibus racemosis, sepalis omnibus sub anthesi patentibus, exterioribus acutiusculis, interioribus obtusis, paulo majoribus, stylo adscendente staminibus longiore, antheris filamentisque minute papillosis æquilongis, ovulis in quoque loculo 1–2, capsula triquetra loculis 1-spermis.—Crescit in prov. Malwan; *fl.* Julio.

This species rises to the height of three feet, and has leaves two feet in length.

5. C. *glaucum*; radice tuberosa, foliis radicalibus recurvis lanceolatis acuminatis basin versus attenuatis subcomplicatis glaucis striatis (marginibus undulatis) scapo stricto erecto simplici squamato duplo brevioribus, squamis pluribus vaginantibus acuminatissimis, floribus geminis approximatis patentibus, sepalis omnibus subæqualibus, pedicellis supra medium articulatis, stylo filiformi stricto staminibus breviore, antheris filamentisque minutissime papillosis, ovarii triquetri loculis 8-ovulatis, ovulis biserialibus.

Folia 8–9 poll. longa, medio 1½ poll. lata. *Scapus* sesquipedalis, tota longitudine bracteis squamæformibus vestitus, multiflorus.—Crescit in montibus Syhadree, lat. 16–19°; *fl.* Aug. et Sept.

The root of this species differs from that of all the preceding. It consists of a spherical depressed fibrous tuber, from the apex of which proceed several stout vermiform fibres, which are not, properly speaking, connected with the tuber, but are derived from the base of the new tuber just forming above the old one, which gradually disappears.

Genus Uropetalum.

1. U. *montanum*; scapo tereti pedali, racemo nutante 8-floro, foliis

linearibus complicatis scapum æquantibus, corolla alba 8-lineari campanulato-tubulosa, laciniis exterioribus tubo paulo longioribus oblongis obtusis, interioribus ad medium connatis conformibus omnibus apice glandulosis, bracteis scariosis caudato-acuminatis, pedicellis longioribus, stylo papilloso, capsula stipitata 3-loba, loculis 3–4-spermis, radice bulbosa bulbo tunicato.—Crescit in montibus Syhadree, lat. 19°; *fl.* Aug.

2. U. *Concanense*; scapo tereti 8–10-pollicari, racemo nutante 3–4-floro, foliis semiteretibus carnosis filiformibus paucis (2–3) dorso planis facie superiore profunde canaliculatis scapo dimidio brevioribus, corolla candida tubulosa sesquipollicari, laciniis omnibus latitudine æqualibus exterioribus patentibus tubo dimidio brevioribus interioribus ad medium connatis omnibus lineari-oblongis obtusiusculis apice papilloso-glandulosis, bracteis scariosis latissimis acuminatis pedicellum subæquantibus, stylo parte superiore papilloso, stigmate breviter trifido, capsula stipitata trilobata lobis rotundatis, loculis 6-spermis, seminibus compresso-planis nigris nitidis lævibus.—Crescit in saxis prov. Malwan; *fl.* Aug.

LEDEBOURIA.

1. L. *maculata*; foliis obovatis glabris in petiolum cuneato-attenuatis, maculis purpureis notatis nunquam bulbiferis.—Crescit ubique in utroque Concano; *fl.* Junio.

Quite distinct from *L. hyacinthina.*

MONOLOPHUS.

1. M. *scaposus*; acaulis, radice fibrosa, tuberibus parvis oblongis e fibris pendulis, foliis lanceolatis glabris longe acuminatis petiolo laminaque æquilongis, scapo erecto tereti bipedali parce folioso, spica terminali compacta imbricata multiflora, floribus geminis bractea lanceolata triplo longioribus, ovario triloculari subrotundo, seminibus in loculis pluriseriatis arillatis, arillo plurilobato.

Calyx tubulosus, subbipollicaris, 3-dentatus, fissus, dentibus obtusis subæqualibus. *Petalorum* exteriorum duo inferiora lineari-oblonga, 5–7-nervia, plana, superius oblongum, subcucullatum, mucronatum, omnia sub anthesi reflexa. *Petala* interiora multo majora, rotundato-cordata; labellum maximum, latum, obtusum, apice bifidum. *Tubus* cylindricus, curvatus, limbo 4–5-plo longior. *Filamentum* brevissimum, lineam longum et latum, supra antheram in ligulam brevem rotundatam ciliatam reflexam productum. *Stigma* infundibuliforme, ciliatum, dorso tuberculatum.—Crescit in rivulorum ripis prov. Malwan; *fl.* Julio.

PANCRATIUM.

1. P. *parvum*; scapo compresso striato 3–4-floro, perianthii tubo longissimo gracili, laciniis linearibus acutis tubo multo brevioribus tribus exterioribus mucronatis, corona perianthii laciniis dimidio breviore apice 12-dentata, dentibus æqualibus, filamentis brevibus vix dentibus coronæ altioribus, antheris dentibus coronæ longioribus, foliis linearibus striatis planiusculis basin versus attenuatis, ovarii loculis pluriovulatis, capsula ovata triloba, seminibus in loculis abortu paucis (1–2).—Crescit in monte Dronaghiri Concani septentrionalis; *fl.* Junio.

Tube of the corolla five inches long, limb one inch; anthers three times longer than the free part of the filament.

CURCUMA.

1. C. *decipiens*; perennis, e radice fibrosa tuberibus amygdaloideis plurimis pendulis intus candidis, scapis primum lateralibus postea ex axillis foliorum e solo tardius emergentium centralibus 6–8 poll. longis clavatis, foliis late ovalibus glabris raro subtus velutinis longe petiolatis, petiolis laminæ pedali æqualibus basi vaginatis, bracteis floralibus saccatis purpureis inferioribus rotundatis superioribus oblongis obtusis, floribus geminis purpureis, calyce infundibuliformi, corollæ tubo dimidio breviore 3-dentato, dentibus rotundatis, corollæ purpureæ tubo intus medio barbato, laciniis exterioribus oblongis, suprema mucronata cucullata, interioribus conformibus labio bifido marginibus crispis, filamento complanato antheræ longitudine, stigma infundibuliformi antice 3-lobulato ciliolato, glandulis epigynis longis linearibus.—Crescit in prov. Malwan; *fl.* Junio—Aug.

The existence of both central and lateral spikes seems to be a new feature in this genus; and I am aware of the existence of another undescribed species having the same peculiarity: the central spikes make their appearance two months after the others.

SAGITTARIA.

1. S. *triandra*; pedalis acaulis, foliis longissime petiolatis lineari-

spathulatis dorso obtuse carinatis scapo multo longioribus trinerviis, nervis 2 marginalibus, intermedio penninervio, petiolis teretibus basi vaginantibus folio duplo longioribus, scapo erecto simplici tereti, apice obtuse trigono florifero, floribus verticillatis breve pedicellatis inconspicuis inferioribus fœmineis superioribus masculis 3-andris.

Radix fibrosa. *Folia* glabra, cum petiolo 9–12 poll. longa, *lamina* 4–5 lin. lata. *Scapus* 5–6 poll. altus, apice floriferus, bracteatus, *bracteis* connatis, vaginantibus, obtusis. *Flores* fœminei in verticillo unico inferiore, masculi supra pluri verticillati, omnes plerumque in verticillo terni. MASC. *Perigonium* 6-partitum duplici serie, *foliola* 3, exteriora ovato-rotundata, interiora non petaloidea, minora linearia, truncata, omnia sub anthesi patentia. *Stamina* 3, sepalis exterioribus opposita, *antheræ* subextrorsæ, *filamenta* brevia, basi valde incrassata, in disco *glandulæ* tres rotundatæ. FŒM. *Perigonium* omnino masculino simile, in disco *ovaria* 3, libera, obovata, sessilia, cum glandulis 3 subulatis bracteæformibus alternantia. *Stigmata* magna, reniformia.—Crescit in aquosis prov. Malwan ; *fl.* Aug.

(*To be continued.*)

Extracts from the private Letters of Dr. J. D. HOOKER, *written during a Botanical Mission to* INDIA.

DARJEELING TO TONGLO.

(*Continued from p.* 91.)

Among shrubby plants, the dwarf *Bamboo* was the most abundant, forming little groves, or cane-jungles, of great elegance and beauty. The tribe (for there are several), with which I almost tire you, would seem, by its bulk and abundance, to make up for the strange paucity of other *Grasses* on these mountains. This is about their upper limit, and they are succeeded in the alpine, or upper, region of the Himalaya by other and more northern *Gramineæ*. The culms of the present species are scarcely broader than the thumb, stiff and erect ; they stand about a span apart, and are 6–8 feet high. Amongst them grew a standard *Dog-rose*, of scanty dull green foliage, but flowering copiously, white and inodorous, 8–10 feet high, with stiff stem and patent coma of widely-spreading branches. The flowers droop from the under-side of the branches, as if they grew so for protection against the rain. Two Barberries are next in abundance: one is like the holly-leaved Fuegian, and the other the counterpart of the small-leaved species of that far-distant region: the first is perennially leafy, the latter scarcely shows a bud yet. Bushes of *Olea, Limonia, Symplocos, Corneæ,* some *Araliaceæ, Hydrangea,* and *Caprifoliaceæ, Euonymus, Celastrus, Rubus, Spiræa, Cotoneaster, Gaultheria, Vaccinium,* and *Daphne.* The larger trees were a few *Oaks,* but chiefly *Rhododendrons* (of which I send a full account separately). Here and there I observed a large *Taxus* (Yew), but much scattered: the largest of these trees measured eighteen feet in circumference, at five feet above the ground; —none of them much exceeded this. Other prevailing trees were of the genera *Pyrus, Prunus, Cerasus, Photinia*? of the *Pruni,* one was very like *Padus,* and of the *Pyri,* there were the representatives in *Aria* and *Aucuparia,** also *Acer, Prinsepia*? and the curious *Anisodus luridus.* Climbing over these were *Kadsura* and *Stauntonia,* the latter presenting magnificent clusters of lilac flowers: *Ochrea* and *Clematis acuminata,* also, in vast abundance. I saw no epiphytal *Orchideæ* above 10,000 feet; but *Ribes* was very frequent, and always parasitical on trees, the racemes of flowers erect.

Many of the above genera are not natives of the regions below 10,000 feet (which is probably the lower limit of the alpine region), and they ascend to the perpetual snow. Again, very many of the prevailing genera and species of 4,000–9,000 feet are not found so high as this, so that the change is evident in the absence of certain groupes, as well as in their replacement by others.

The plants characteristic of the Darjeeling region, and which do not appear to ascend to this, or do attain it and are seen no higher, are *Magnoliaceæ, Balsamineæ, Vitis, Zanthoxyleæ, Meliaceæ,* most of the *Rubi, Melastomeæ, Cucurbitaceæ,*† *Begonia, Aquilaria,* arborescent *Araliaceæ, Bucklandia, Corneæ, Loranthaceæ, Rubiaceæ, Lobeliaceæ, Styraceæ, Jasmineæ, Apocyneæ, Asclepiadeæ,*‡ *Cyrtandreæ, Solaneæ* (except *Anisodus*), *Labiatæ, Acanthaceæ, Verbenaceæ, Laurineæ,*§ *Euphor-*

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* A small apple grows wild on these hills, at 6,000 feet.

† Only one species above 9,000 feet.

‡ A *Holarrhena* ascends to the height of 10,000 feet.

§ Ascend to 8,000 and 9,000 feet.

biaceæ, *Piper*, *Urticeæ*, *Ficus*,* *Juglans*, *Scitamineæ*, *Epiphytal Orchideæ*, and *Pothos*.†

Still there are many Himalayan genera, of which I have seen nothing, or only such representatives as grow at the very top of Tonglo: I know that in other Himalayan regions, they descend considerably below 10,000 feet; but they certainly do not in the parts of Sikkim I have examined, though they no doubt inhabit the regions from 10,000 feet to the snow. Such I shall enumerate, with the known Himalayan species of each. *Ranunculi* (of which upwards of 20 Himalayan species are already described), *Thalictrum* 16, *Clematis* 18, *Anemone* 10, *Trollius*, *Aquilegia*, *Delphinium* 14, *Aconitum* 9, *Actæa*, *Pæonia*, *Cimicifuga* and *Nirbisia*, *Podophyllum*, *Corydalis* 17 (I have seen but two species) *Cruciferæ* 40 species (I have only found 1!), *Parnassia*, *Alsineæ* about 20 (only 3 or 4 in my herbarium), *Hypericineæ* 11 (of which I know 3), *Geranium* 16 (my herbarium numbers 3), Alpine *Leguminosæ* about 40 (I have but 1!), *Spiræa* 11 (1 in my herbarium), *Potentilla* 40 (I know only 3), *Rosa* 7 (I have seen 1), *Epilobium* 15 (2 known in Sikkim), *Circæa* 3, *Crassulaceæ* 20 (I have none), *Ribes* 6, *Saxifraga* 22 (not one in my herbarium seen by myself), *Umbelliferæ* 80 or 100 (I have 5 or 6), *Lonicera* 21 (4 or 5 in my herbarium), *Valeriana* 15 (I have 2), *Dipsaceæ* 14 (Herb. Hook. 0): *Compositæ* and *Labiatæ* are not in flower yet, so I cannot judge of them, but certainly the alpine genera *Aplotaxis*, *Erigeron*, *Aster*, *Doronicum*, *Dolomiæa*, *Senecio* (30 species known, none seen at Darjeeling yet!), *Saussurea*, &c., only occur at elevations above 10,000 feet; *Campanulæ* 26 (Herb. Hook. 5 or 6), *Gentianeæ* about 50 (I have only 8 or 10), *Boragineæ* 38 or 40 (I have 2 or 3): in *Scrophularineæ* I am very poor, *Veronica* 0, *Pedicularis* (of 18 Himalayan species I have seen but 1), *Primula* only 1, below 10,000 feet! I have compared no further, but the above statement proves how rich is the Flora of the upper, or alpine region. I have enumerated, as possessing only what I have seen: in my herbarium are a few *Crassulaceæ*, *Saxifrageæ*, *Dipsaceæ*, and *Compositæ*, brought to me from the snowy passes; but they either occur always above 10,000 feet; or the influence of the great body of snowy mountains very possibly causes their seeking a lower level in the interior Sub-Himalayan hills, than in the outer ranges, where Tonglo, Sinchul, and the heights I have examined, are situated. With regard to *Pines,* this must be true; for we have *no species whatever* between the level of the *P. longifolia,* at 2,000, and *Taxus,* at 10,000 feet; and yet I possess *P. Webbiana,* a *true Larch,* and several *Junipers,* from Sikkim.

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* One species reaches 7,500 feet.

† Upper limit 7,000 feet.

I do not doubt the influences I enumerated, as modifying the climate of Sikkim, tend to confine the alpine vegetation to a higher level here. The climate of Sikkim is certainly much more equable, and equability characterizes much loftier levels here, than in any part of the Himalaya west of this, or than Bhootan; whence arises the rich list of genera which delight in such a climate. Though poor in many of the alpine genera, and much poorer than similar elevations in the north-west or in Bhootan, Sikkim is probably considerably richer in Orders which belong to a damp temperate region, than any other part of the Himalayan range of an equal area; my collection abounding peculiarly in *Araliaceæ, Begonia, Cyrtandreæ, Orchideæ, Ericeæ,* especially *Rhododendrons, Symplocos, Urticeæ, Magnoliaceæ, Oaks, Palms,* and *Bamboos,* which latter, I expect, attain a much greater elevation in Sikkim than either east or west of it, as well as being more numerous in species.

We encamped on marshy ground, somewhat below the summit of the mountain, somewhat sheltered by the *Rhododendrons* and by a little hill. We cut logs of wood to floor our tent, the black soil being so oozy that we sank in it. Continued rain all the evening, with thick fog and a penetrating Scotch mist, rendered the spot most uncomfortable, just like the top of Ben Lawers, in regular Highland weather. Except a transient glimpse into Nepal, we had no view, rolling mists tumbling over the mountain-top and obscuring all. I walked about a little, collecting, but was soon so saturated, that in a strong wind it was difficult to keep tolerably warm, with the thermometer at 50°.

Our poor Lepchas were miserably off, having only the little bamboo to thatch their small sheds withal, and no blankets or other covering. Four bamboo-sticks, and a thatch, afforded their only protection from the inclemency of the weather, and under such shelter they crouched on the sodden turf, in groups of two or three, huddled together. The Hindoos of our party we were obliged to accommodate in the tent: two were already ill with fever and ague, and one of the Lepchas with diarrhœa, from the sudden transition from the deep hot valleys below, to this much colder region. Having no reason to anticipate such bad weather in May, we made the best arrangements we could for the night, and nursed good hopes of clearer skies on the morrow. I sank a thermometer two feet six inches in the soil, hung my instruments close by, under a *Rhododendron*, and made a "corduroy road" (as the Canadians call one of transversely-laid logs of wood), by which I could walk every now and then, dry-ankled, to observe them.

During the night the rain was very heavy, and the weight of water caused the tent to collapse upon us. By propping the slopes with sticks, and laying the wax-cloth of my plant-papers over our shoulders, we got through the night.

On the following morning, and throughout the day, there was no improvement in the weather; so that I could only collect in the immediate neighbourhood of the tent, returning every few minutes with bundles of plants, and to note the botanical features of the place. As the climate was too cool to cause the plants or sodden paper to rot, I was enabled to make a very fair collection in this way; though I must own it was far from a soul-stirring pursuit, in such disappointing weather. Two more Lepchas, and as many Hindoos, fell sick during the day, whom we accommodated in the little tent, which had soon eight inmates instead of the two for whose comfort it was already narrow enough. This tendency to fever and ague, shown both in the natives of the plains who visit Darjeeling, and the hill-people themselves, when too much exposed, appears very singular to me: such attacks being altogether unknown amongst Europeans, however weak and otherwise predisposed.

Finding the tracks of sheep, we sent two Lepchas in pursuit, with instructions and money to buy food and blankets from the shepherds. The foragers returned, after being away the whole day, bringing two sheep and two lambs, all of the lean kind, which they bought for about five shillings. No blankets were to be coaxed away from the shepherds; but our poor fellows were only too well satisfied with our liberality in giving them two sheep and one lamb, the second of which latter we reserved for ourselves. A kettle-full of hot weak grog, which Barnes brewed from our bottle of whisky, did them all good, even those who had the ague. I should mention that the Lepchas or Ghorkas of our party never uttered a complaint, not even the sick ones; the Bengalees, of course, gave way to dismal complaints, not much to be wondered at, considering they had recently left the scorching plains of India. My two Calcutta collectors have not one spark of energy, and I have well-nigh lost pity and patience for them. The native of the plains passes such jokes on a hill-man, who leaves his mountains for a season, as a cockney does on a Yorkshireman; and, *vice versâ,* the Lepcha dearly loves to catch a Bengalee in the hills; and I cannot keep the younger ones of our party from making game of the collectors, than whom it were impossible to be cumbered with more useless beings, for whether well-housed and fed at Darjeeling, or employed elsewhere, they were thoroughly good for nothing. Their apathy, idleness, and self-conceit have extinguished my sympathy for their discomforts.

As disappointing as anything was our inability to obtain any view; and that which such a position commands is described as very grand, embracing the snowy range from far west in Nepal, to Chumalari in Thibet; including Kinchinjunga and the Sikkim forests of snowed peaks towards the centre, the deep valleys on either hand intersected by innumerable mountain ridges; the courses of the rivers Teesta, Konki, and Cosy, from their snowy courses, through the Sub-Himalaya; and the whole of the plains, from the foot of the hills, with the Morung Terai skirting their base, to the Ganges or Rajmahal hills in the extreme south. For three days did we patiently wait; but neither to east, west, north, or south could we see one inch beyond the mountain-top. At length, the rain (but not the clouds) dispersing, we gladly took the opportunity of letting the tent dry in the wind, and started on our departure.

During the whole of the 27th, from 7 A. M. to 11 P. M., the mean temperature was 51·8°; the thermometer never varied 6·5 degrees, standing at 47·5° in the morning, 54° at 1 P. M. (its maximum), and 50·7° at night, and on the following morning the same. The sunk thermometer (two feet six inches) maintained the constant temperature of 50·7°. Though the rain was so heavy, there was always evaporation going on, the atmosphere, though sufficiently damp, never indicating the saturation point; the mean dew-point 50·3, and the humidity, consequently, 0·973.

Having sent the tents and men forward, we tarried a few hours on the top, in alternate shower and sunshine, vainly hoping for the most modestly narrow view of anything at all beyond mist and *Rhododendrons.* I had sunk a thermometer at the very top, to the same depth as the one below, which indicated a "bottom heat" of 49·7°, or one degree lower than at the station, only sixty feet below, no doubt caused by the greater exposure of the summit. The air was a good deal (6° or 7°) warmer, owing, apparently, to the sun heating the dense mist which surrounded us, but which is cooled by contact with the trees, a little below the summit. A series of barometrical observations, compared with synchronous ones taken at Calcutta, gave the elevation of the top 10,078 feet. The measured height of Tonglo, by Colonel Waugh's grand trigonometrical operations, is 10,079 feet.

The number of *Lichens*, *Hepaticæ*, *Mosses*, and *Hymenophylla*, growing at the top, is very great ; and I found *Sphagnum* in abundance, which is rare in Sikkim, and almost confined to moist rocks, owing to the want of any exposed marsh at lower elevations. Some other *Ferns*, also, were common, and a few *Agarici* on the twigs. The *Lichens* especially infested the *Rose*, *Barberry*, and a small *Cherry*, called *kumpee*, which was very abundant. The *Bamboo* (Phieung) has always clean stems, and so are the *Rhododendron* trunks, for the most part, owing to their papery bark.

(*To be continued.*)

BOTANICAL INFORMATION.

Letter from Mr. Berthold Seemann, *Naturalist of H.B.M. Surveying-Ship* Herald, *addressed to Sir W. J. Hooker, after the return of the Herald from the second voyage in search of Sir John Franklin, by the way of Behring's Straits, and dated Mazatlan, Mexico, Nov.* 13, 1849.

We quitted the harbour of Honolulu (Sandwich Islands) on the 19th of May, 1849, again directing our course towards the north, in order to renew the search for the expedition under the command of Sir John Franklin. Expecting to obtain some information respecting H.M.S. Plover, we entered the Port of Petropaulowski, Kamtschatka, where we met the Nancy Dawson, a schooner equipped by a private gentleman, Robert Shedden, Esq., for the express purpose of discovering some traces of the Arctic voyagers. As nothing had been heard of the Plover, we remained only one day, which I devoted to collecting. The winter in Kamtschatka had been uncommonly severe, the thermometer having stood so low as 17° of Fahr. *below* zero. The day of our visit was the 22nd of June. The general thawing had commenced in the beginning of April, yet snow was still to be seen in ravines and shady places. On the southern slopes of the hills spring-flowers were already blooming; among them, *Trillium obovatum*, *Veratrum viride*!! *Clematis Sibirica*, *Corydalis ambigua*, *Rubus arcticus*, *Potentilla anserina*, *Veronica Stelleri*, and an *Orchis* resembling the *O. maculata*. The people were just commencing to prepare the ground, and to reconstruct the fences around their town-gardens, which they pull down every autumn, in order to prevent the snow from accumulating, and to open a free passage for the driving of sledges—their principal amusement during the long winter. No grain of any kind is grown in the southern parts of the peninsula. I am assured, however, that at Cape Kamtschatka, in lat. 56° N., rye and barley are raised in considerable quantities. In a former account I mentioned that the Bay of Awatscha produces only two kinds of trees, the *Betula incana* and *Pinus Cembra*. The poplar (*Populus balsamifera*) enumerated in Beechey's 'Botany,' I have never seen in a wild state. In the Governor's garden, near Behring's monument, is an avenue of these trees, from which the specimens transmitted by Messrs. Lay and Collie may possibly have been taken.

The voyage was continued on the 23rd of June, and on the 15th of July Chamisso Island, in Kotzebue Sound, was reached, where we had the satisfaction of meeting H.M.S. Plover. That vessel had arrived too late last season, and being unable to pass through Behring's Straits, was compelled to winter on the Asiatic shore, at a place called Oorel Koimak. On Chamisso Island everything was in flower, and my excursions, consequently, proved productive. For the first time I found *Pinguicula vulgaris*, not previously noticed in this part of the American continent. Plants were abundant, but more numerous were the mosquitoes: they tormented me so much that the blood was regularly streaming from every unprotected part of my body. In the tropics they are often troublesome; but in the worst mangrove-swamps I have never experienced anything to equal those of these northern regions. The tropical mosquitoes are small, extremely swift, and, though it generally proves a vain attempt to kill them, yet they may be driven away. Far different are these northern ones, which are much larger, very sluggish in their movements, and, after they have once taken up their position, are with difficulty frightened. Fifty to a hundred may frequently be destroyed by a single dash of the hand, yet all this is of no avail; their place is instantly reoccupied by fresh recruits. At last a person becomes so fatigued with unsuccessful attempts of freeing himself from his tormentors, that he is obliged to give up killing them in despair, and to submit patiently to their irritating operations.

On the 19th of July, the three vessels, Herald, Plover, and Nancy Dawson, left for Point Barrow. It was beautiful summer weather. The sky was blue and serene, the sea perfectly free from ice, and the sun shining without intermission during the twenty-four hours. I had often longed to witness the latter phenomenon, in order to observe its effect upon the so-called *sleep* of plants. It is generally supposed that daylight is the great agent which causes leaves to expand. By observation I arrived at a somewhat different conclusion. When we left for the north, I planted some seeds of a new species of *Phaseolus* found on the Andes of Veraguas. The place was so situated that the sun could scarcely ever shine upon them, though they had plenty of light and air. While we remained within the boundaries of the tropics their leaves shut up at five o'clock P.M., sunset being at six P.M. The farther we proceeded towards the north, the longer they remained expanded; and when the sun disappeared at ten P.M., they fell asleep at eight P.M. This, however, was their latest hour; they never remained expanded after that time, even when, in the higher latitudes, the sun was, at midnight, high above the horizon. The mere daylight made no alteration; yet the leaflets could at any time be made to expand by directing the rays of the sun upon them.

We passed Cape Lisburne, a high promontory, Icy Cape, a low spit, and anchored, on the 24th of July, off Wainwright's Inlet, in lat. 70° 36′ north. From that place four boats of the expedition and the Nancy Dawson started for the Mackenzie river, while the Herald and Plover, resuming their voyage without delay, obtained, on the 26th of July, the first sight of the packed ice. The ice-line extended from S.E. to N.W. It was traced by both vessels until, in the morning of the 28th of July, after having attained lat. 72° 48′ north, three degrees higher than had from this side ever before been reached, all further progress was impeded by huge masses of ice, the habitation of numerous Walruses. Being thus prevented from penetrating farther northward, the ships returned to Wainwright's Inlet, which had been suggested as a wintering-place for the Plover; and while the hydrographical survey was going on, I was enabled to collect. The natives here seemed a very cheerful people, who behaved in a very friendly manner towards us; they had, however, but a faint idea of *meum* and *tuum*, and emptied our pockets with as much skill as if they had served their apprenticeship in some European capital. Tobacco was highly valued by them, as they are very fond of smoking. Fire, for that purpose, they do not, like the Esquimaux of Kotzebue Sound, obtain by rubbing two pieces of wood, but by striking of steel and stone, using, instead of tinder, the silky hair of *Eriophorum angustifolium*. The leaves of *Rumex domesticus*, Hartm., of which I saw them gathering great quantities, are eaten by them.

Finding Wainwright's Inlet, on account of the shallowness of the water, unadapted for a winter quarter, we left on the evening of the 1st of August, taking a southern direction. The fine season seemed now to be past, heavy gales from the S.E., rain, snow-storms, and dense fogs following each other in quick succession. This led to an involuntary separation of the two ships. The Herald steered for the Asiatic side, to a place where, according to Baron von Wrangel, some islands had been seen from the Siberian coast. The search for them was not fruitless. On the morning of the 17th of August, land was descried in a northern as well as in a western direction. That situated towards the west, being surrounded by ice, could not be approached, and its high mountains were soon involved in clouds. That bearing north, however, became more defined towards ten o'clock A.M.; and in the afternoon, the captain and a party, of which I formed one, went to take formal possession of it. The new discovery is called *pro tem.* after the ship, "Herald Island." It lies in lat. 71° 19′ north, long. 175° 23′, is about twelve miles in circumference, 1,200 feet high, and chiefly composed of coarse granite. Up to the elevation of 900 feet, the rocks rise almost perpendicularly, then follows a succession of terraces covered with a turfy vegetation. The landing was effected on the N.E. side, where a few plants were obtained, viz., an *Hepatica*, two *Mosses*, a *Grass* (probably *Poa arctica*), one of the many varieties of *Artemisia borealis*, *Cochlearia fenestrata*, and the rare *Saxifraga Laurentiana*. The rocks were covered with a reddish lichen, but, owing to the steepness of the formation, no specimens of it were procured. Taking this lichen into account, eight species were seen, belonging to seven natural Orders, and representing eight different genera.

We now returned, and anchored off Cape Lisburne on the 23rd of August. When we obtained the first sight of this promontory, it was covered with snow. This, however, on my landing the following day, had nearly disappeared, and had injured the vegetation less than might have been expected. Cape Lisburne is the most elevated part of the north-west coast. It is principally formed of argillaceous slate, "swine"? and limestone, and abounds in rare and beautiful alpine plants. *Saxifraga Richardsoni* grew profusely in damp places. Torrey and Gray suppose its flowers to be white, but they only approach that colour when fading. The ovary, the stamens, and the base of the petals are purple, the apex of the petals is either flesh- or rose-coloured, with veins of a deeper tint. The petals of the Spider-plant (*Saxifraga flagellaris*), another production of Cape Lisburne, are of a deep yellow colour, with red dots upon their inner base, precisely the same as those of *Saxifraga Hirculus*. The sterile plants of this species have very much the appearance of young *Semperviva*. *Dodecatheon frigidum*, Cham., was also plentiful: its petals are purplish-violet, at the base yellowish-white.

Leaving Cape Lisburne, we steered for Point Hope, and met there two of the boats that had been despatched towards the Mackenzie River, and the Nancy Dawson. The schooner had penetrated as far as Elson Bay, from whence the two lighter boats had taken their final leave for the Mackenzie, while the two larger, in company with the Nancy Dawson, returned to Point Hope. They brought with them no information whatever respecting Sir John Franklin's expedition. The Herald, after experiencing several severe gales and very bad weather, reached Kotzebue Sound on the 2nd of September, where the Plover, Nancy Dawson, and the boats, were found safely anchored near Chloris' Peninsula. During this cruize the dredge had been frequently in use, by means of which marine animals and seaweeds were obtained. The *Algæ* are few as to species, and all of extremely delicate texture.

Several snow-storms and severe night-frosts had greatly altered the aspect of Kotzebue Sound. Mosquitoes had disappeared, Mosses and Lichens were advanced, the *Arbutus alpina*, the most common plant of this district, had assumed its autumnal dress, and, in fine, everything bespoke the fast approach of winter. Nevertheless, some of my excursions on Chamisso Island and Chloris' Peninsula were profitable. The country adjacent to the Sound produces a prodigious number of berries, which proved of great value to the ships, after having been so long without any vegetable food; they are also actively gathered by the natives, who, during this season, almost live upon them. There are eight different kinds, viz. :—*Vaccinium uliginosum*, *V. Vitis-idæa*, *V. Oxycoccus*, *Rubus acaulis*, *R. Chamæmorus*, *Arbutus alpina*, *Cornus Suecica*, and *Empetrum nigrum*.

In Eschholz Bay, Kotzebue Sound, a river empties itself, which was discovered by Captain Beechey, and called by him in commemoration of Professor Buckland, the celebrated geologist. The hostile disposition of the aborigines prevented him from ascending it; but as an amicable relation was now established, Captain Kellett resolved to explore it. Leaving the ship at noon of the 8th of September, we reached Elephant Point towards the evening. The remarkable ice-formation of that place was again visited, and some fossil bones collected. Enormous portions of the cliffs had separated, proving beyond doubt that the ice is not a mere superficial coating, but a regular *berg*, covered with alluvial soil. Similar formations are frequent all along the banks of the Buckland, and their continued thawing seems to indicate an increasing temperature towards the pole. The river, which has several deltas densely covered with *Hippuris maritima* and *Eriophorum angustifolium*, discharges its waters through two channels. We entered on the following day, and anchored opposite a native encampment on the right bank. The Esquimaux were exceedingly friendly, inviting us into their tents, and placing raw meat and berries before us. They also gave us a root to eat, which they called *Ma-shoo*: it had been roasted in the ashes, and resembled in taste the potato. I was anxious to obtain a sight of the plant which produced it, and, for a few pieces of tobacco, induced some of the natives to show it to me, when I found it identical with *Polygonum viviparum*, Linn., a herb common from Behring's Straits to Wainwright's Inlet. As wicks for their lamps, the natives employ *Sphagnum angustifolium*. Of *Allium Sibiricum*, which here grows in great abundance, they did not seem to make any use, though to our frugal meals it proved an acceptable acquisition.

On the 10th of September the boats ascended. About noon we climbed a hill, from the top of which a fine panoramic view presented itself. The river takes a southerly direction, and forms several islets in its bed. The banks are generally low, the water shallow even for boats, and many places are full of shoals. The country is flat, much intersected by lagoons, and but thinly covered with low bushes of Beech and Willow. At a distance, towards west and south, high mountains are discernible. During the course of the day we passed several islets, and halted late in the afternoon at a low spit, where I obtained *Sanguisorba Canadensis, Rosa cinnamomea, Galium rubioides, Allium Sibiricum, Lithospermum denticulatum*, &c., &c., all more or less injured by frost. During the night the sky was illuminated by an aurora borealis, the most remarkable I had ever seen. It extended from the constellation of the Great Bear to that of the Pleiades, throwing out rays, which seemed to move like a flame when affected by a strong breeze.

Early in the morning of the 11th of September, we proceeded, but at noon were stopped by a waterfall, over which it was impossible to carry the larger boats. At this place we came to an extensive Esquimaux village nearly deserted, the inhabitants, with the exception of three, having gone to the coast to catch fish. All the dwellings were underground. I crept into several, and found in one of them an old branch of the White Spruce, *Abies alba.* As at every turn of the river I had expected to obtain a glance of some *Coniferæ,* but always been disappointed, I was quite delighted with this fragment, as a sure indication that the tree itself could not be far distant. The village was surrounded by groves of willow, *Salix speciosa,* Hook. et Arn., deserving here, for the first time, the name of *trees.* Though their stems were from eighteen to twenty feet high, by five inches in diameter, yet no sign of flower or fructification could be detected, which leads to the belief that this species, the most robust of all known willows, attains towards the south a great size. I have never found it with catkins. In habit it somewhat resembles the *Salix Lapponica,* Linn. Among the other plants gathered here were *Lupinus perennis, Potentilla fruticosa,* and *Marchantia polymorpha,* none of which I had previously seen. The Buckland, up to this point (lat. 65° 59′ N., long. 161° 7′) takes a southern, and from thence an eastern, direction.

While a small party, under the direction of Commander Moore and Lieutenant R. Macguire, proceeded to trace the river to its source, Captain Kellett and I returned, regaining the ship on the evening of the 15th of September. The party went five days farther than we did, till the water became too shallow for boat-navigation.

On parting, I directed the attention of Mr. R. Macguire, the first Lieutenant of the Herald, to the White Spruce; and not only did that officer bring some excellent specimens of it, but also a fine collection of other plants. New to me were several mosses, *Cistopteris fragilis*, the red currant, *Ribes rubrum*, and, quite unknown, a shrub, *n.* 1794, of which the leaves are preserved in the herbarium. *Abies alba* grows, according to Mr. Macguire, in clumps on the banks of the river, attaining a height of twenty feet. The fern, *Cistopteris fragilis*, was found near a beautiful formation of basaltic columns. Though the existence of *Coniferæ* is now ascertained, the exploration of the river has proved that not all the drift-wood with which the shores of Kotzebue Sound abound, originated on the banks of the Buckland, leaving the question from whence it came as problematical as ever.

(*To be continued.*)

Mr. SPRUCE'S *Journey.*

We have received further information of the progress of Mr. Spruce, up the Amazon River. He had visited Igaripés, brilliant with the *Victoria regia*; and we regret that our want of space prevents us from laying the highly interesting particulars of this Royal Aquatic before our readers till the next month's number.

North American Plants for the Herbarium.

A recent letter from Dr. Asa Gray announces that a further distribution of Lindheimer's Texan plants is despatched for the English subscribers; and that twelve sets (only) are preparing of Mr. Wright's collections, made recently between Western Texas, El Pasco, and New Mexico, are nearly ready. Mr. Wright is preparing for another expedition to the West and North of El Pasco, which it is expected will yield a rich and abundant harvest.

We may take occasion here to state that a very fine and especially beautiful set of the late Mr. Oakes' New England plants is about to be sent (with the collections above-mentioned) to Mr. Heward, for sale, consisting of about 500 species, at the price of 23 dollars.

NOTICES OF BOOKS.

Paxton's FLOWER-GARDEN; *by* JOHN LINDLEY *and* JOSEPH PAXTON. 4to. No. I. and II. London. March and April 1850.

The close of the year 1847 witnessed the termination of Edwards' 'Botanical Register,'—a work commenced, we believe, in a spirit of rivalry, if not of hostility, to 'Curtis's Botanical Magazine;' but, of late years, under the editorship of Dr. Lindley, it has proved one of the most important vehicles for the communication of pure botanical and horticultural knowledge that has ever appeared in any age or country. It reached to the completion of the 33rd volume.

At the close of the last year, 1849, Mr. Paxton's 'Magazine of Botany' also was concluded with the 16th volume; and, at the same period, it was announced that a new work would appear shortly, in the joint names of Lindley and Paxton (and no names can stand higher in Botany and Horticulture), the object of which was "to supply, in monthly numbers, as full an account of all the new and remarkable plants introduced into cultivation as is necessary to the gardener, and as the price and extent of a periodical will furnish. The history of such plants will be sought in the Botanical works published on the Continent, to which cultivators have little access, as well as in those of our own country, and in the gardens or herbaria from which they are derived." "To effect this purpose, it is proposed to separate each number into two distinct parts. In the first part will be found three coloured plates of plants, which, from their beauty or remarkable tints, especially demand this expensive style of illustration." "The title of the second part, 'Gleanings and Original Memoranda,' fully explains its purpose. Unimportant species will be merely mentioned; those of higher interest will be described at greater length; and of the most remarkable kinds there will be introduced woodcuts, in which an attempt will be made to combine accurate representations with some pictorial effect." In short, the work may be considered an union of the publications of the two respective authors, with the addition of the plants "sought in the Botanical works published on the Continent."

With a view to render full justice to the plates, an artist from Paris has been engaged to prepare the figures in London; and the first two numbers, mentioned at the head of this article, all that have yet appeared, are now before us, in which the pledge of the authors to the public is fully redeemed, that there should be a great amount of figures and subjects at a very small cost. We must confess ourselves, however, a little disappointed with the "beauty or remarkable tints" of the coloured plates. They are not equal to the majority of those of the 'Botanical Register,' a fair subject for comparison. The first Plate is *Sarracenia Drummondii*, on a reduced scale;—the upper part of a leaf only of the natural size, no flower, though it has been represented in that state, some years ago, in the 'Annals of the Lyceum of Natural History of New York,' as quoted by the authors. The history of the plant, however, is exceedingly interesting. The second Plate represents *Adenocalymna nitidum*, which we venture to consider identical with *Adenocalymna comosum*, De Cand. and Bot. Mag. t. 4210, with the bracteas fallen off. Plate III. exhibits *Cattleya Walkeriana*, Gardner; "perhaps the nearest relation of this plant is with *C. superba*, from which, however, its dwarf habit and incomplete lip readily distinguish it." The description is accompanied by an enumeration of the twenty species at present grown in our collections. The woodcuts in the gleanings are *Aristolochia picta*, from Van Houtte's 'Flora.' A leaf of the fine *Berberis Japonica* (*Ilex*! of Thunberg), of China, now in cultivation with Messrs. Standish and Noble, at the Bagshot Nursery, *B. Loxensis*, *B. Darwinii*, and *B. tinctoria*; *Spiræa decumbens*, *Grammanthes gentianoides*, and *Calandrinia umbellata*, and thirty-two species in all, are more or less noticed in the "Gleanings."

No. II. gives coloured representations of *Ceanothus dentatus*, of California, *Adamsia versicolor*, n. sp., from China (Mr. Fortune), and *Oncidium hæmatochilum*, n. sp., from New Granada, accompanied by a list of all the plurituberculate-lipped species known in cultivation. To these are added thirteen woodcuts of rare or little-known plants; and twenty-six species are noticed, with observations.

The 'Gardener's Magazine of Botany,' &c., by Thos. More and W. P. Ayres, &c., must, for want of space in the present, be noticed in our next, number.

Extracts from the private Letters of Dr. J. D. HOOKER, *written during a Botanical Mission to* INDIA.

DARJEELING TO TONGLO.

(*Continued from p.* 151.)

The descent was slippery and uncomfortable, from the wetness of the clay-banks and the occasional showers. At about 6,000 feet we left the region of rain and clouds, and here found both *Balanophora* and *Monotropa* pushing through the soil: the former is a new monœcious species, with the scaly leaves forming a cyathiform involucre half-way up the peduncle. I need not say how vastly pleased I was, at coming unexpectedly, and at such an elevation, upon a genus which had long engaged my close attention at home. I have since found the same species at 8,000 feet, the *B. dioica* at 7,500, and *B. polyandra*, Griff., and *typhigera*, Wall., at lower levels, but all within the temperate region, *i. e.*, above 4,000 feet.

We arrived at Simonbong by dark, and, our little tent being very wet, we begged accommodation from the Lama. Considering how jealous these people are, and how averse they have shown themselves to intercourse with Europeans, we were agreeably disappointed at receiving a civil affirmative,—not an invitation to his house, though, which was too poor for the reception of the first Europeans he had ever seen, but to the temple itself, which he placed at our service, without even locking the sacristy. A better tribute could not well be paid to the honesty of my Lepcha followers. He only begged us not to disturb his people, nor to allow the Hindoos of our party to smoke inside.

The Lama's temple is of wood, raised on posts, opening on a short stage at one gable, and with windows having sliding wood-shutters on each side of the upper-end, where the altars, &c., are. A piece of stone served for a fire-place at the door-end. The roof was very low-pitched, and there were neither tables nor chairs, nor other furniture, except a little settee and some shelves near the altar. The Lama is of Thibetan origin, born in Sikkim, and consecrated by the high Lama priest of Changachelling, one of the principal convents in Sikkim, and which is always itself consecrated from Lhassa. He lives alone, in a house hard by, but has two Bhotea boy-assistants, who sleep in the temple, each stretched on large planks of wood, close to the altar. These beds were made over to Barnes and myself: wofully rough and hard they were, and far from clean; but we congratulated ourselves on their dryness. The springy couch of bamboo, which the Lepcha makes in your tent, renders the carrying a mattrass, or anything but blankets, superfluous.

The altar was uncanonically placed at the west end of the building, the front rudely chequered with black, red, and white paint. On it stood seven neat hemispherical brass cups, full of water, all in a row; behind them a human thigh bone, bored and pierced at each condyle; some common black bottles, with sprigs of *Abies Webbiana*, a *Juniperus*, and the purple small-flowered *Rhododendron*; a large conch-shell, with the sacred *Lotus* carved on it; and a brass jug of beautiful design, evidently Chinese, in which two long peacock's feathers were stuck.

Above the altar were ranged shelves, with numerous Hindoo idols, brought from the plains; on one side a box full of sacred MSS., in the Thibetan character, and branches of *Juniper*, &c., and on the other a rude model of the Sumbo-nath temple at Cattmandu, in Nepal. On the ground stood the widely-famed praying-cylinder, which I was charmed to see for the first time. It consisted of a leathern cylinder (like a Stilton cheese) placed upright in a frame: a projecting piece of iron strikes a little bell at each revolution, the revolution being caused by an elbowed axle and string. Within the *cheese* are deposited written prayers, and whoever pulls the string properly is considered to have repeated his prayers as often as the bell rings.

Before the altar was a small settee, with a low form on one side and a little framework like a child's chair in front. The table exhibited a handsome Chinese carved bell, some water-vessels, an incense-holder, burnt juniper, and other mystical emblems;—the chair, a broad brass platter, with a brass egg-cup inverted on it. Against the wall of the house leaned a huge tambourine and curved iron drum-stick. Various other little articles hung about the building, or were stowed away in lockers or cupboards, chiefly books, I was told, too sacred to be looked at every day.

Before daylight in the following morning, we were awakened by a dreadful noise, and, jumping up, I saw the two boys hammering away at the huge tambourine gong, near the foot of the plank on which I lay. When tired of this, which lasted for ten minutes, one of them went to the altar, took up the thigh-bone, and drew far from dulcet strains therefrom, and, when tired of that, took a spell at the conch till his cheeks ached. I cast a rueful look at my companion, Mr. Barnes, whose eyes, little less sleepy than mine, were fixed on the door, by which the Lama entered, marching with solemn gait, bare-legged and dirty-faced, his closely shorn head covered with a square Tartar red cap, a loose gown of red cloth girt round the middle, and under-garment of questionable colour, possibly once purple. He muttered, groaned, and uttered such extraordinary sounds, that we were fairly aroused, and, huddling on my cloak, I watched his proceedings, which, if not very interesting (still less edifying), are novel to a European. Fetching a little bag from one end of the room, he turned the quilt-covering of the settee and squatted down cross-legged, still groaning forth his prayers in a most deprecating voice. Reversing the egg-cup in the basin, he filled it with water, and, after the disposal here and there of other waters from the jugs and on the table, drew a curious little bell from his bag, beat it with the donge, or rang it, then took off his beads, and with the other hand counted them as he prayed. "Maliva, O Maliva," he uttered, in a most agonized tone, scattered water about the room, refilling the platter each time, and adding a few grains of rice. After a due sprinkling, the remaining water was thrown away and the bell resumed; also a larger one, as big as an ordinary dinner-bell, very handsome, with idols all round the mouth and sides: this he rang violently, growling, squeaking, praying, snapping his fingers, and clapping his hands; then restoring the little bell and symbol, &c. to the bag, they were hung up again. Fire was next brought, and put in an open censer, with juniper ashes, and placed outside the window, the grateful smoke being wafted in; he then resumed praying with the big bell, and, after a tedious repetition of similar ceremonies, cleaned his water-pots and cups, threw all the remaining water out of the window, and retired, greatly to my relief; for the noise of the bells was intolerable in the early morning, and much worse than the thigh-bone, conch, or gong. Fervid as the devotions appeared, to judge by their intonation, I fear the Lama felt more curious about us than was proper under the circumstances; and when I tried to sketch him, his excitement knew no bounds, he fairly turned round on the settee, and, continuing his prayers and bell-accompaniment, appeared to be exorcising me, or some spirit within me.

Throughout the worship, and in all the arrangements and implements, the mixture of Hindooism, Boodhism, and Catholicism was most striking, and of Judaism, too, if the "burning of incense" originated, as no doubt it did, with the Jews, though now common to almost every form of religion, except the Protestant Christian. The Juniper of the Old Testament is believed, however, to be the *Spartium monospermum*, which I saw growing between Cairo and Suez, in company with the *Rose of Jericho*, *Gum Acacia*, &c. It is the plant generally used for charcoal in those and other parts of the eastern land of Bible history:—"Hot coals of Juniper." The devotions were, of course, paid to the gods and saints of the Boodhist calendar: the praying-cylinder, conch, and human thigh-bone are essentially Boodhist, even the bell. The form of the altar, however, is decidedly Catholic; so is the conventual system, celibacy of the priests, their red gowns, shaven heads, and bare feet, their rosary, and, above all, the consecration of the priests by the laying on of hands, and the blessing of the people on certain occasions, when the hand is also placed on the heads of the great, and the poorer class are touched with an ivory staff, or, if too numerous, blessed *en masse*, from the gates of the temple. All these, and many other particulars, the Lama communicated without reserve. He was a very civil person, in short, and invited us to come back when one of the great festivals should be held, and the holy books would be produced, the people (bringing the first-fruits of their flocks and their fields) would be blessed, and, above all, the thigh-bone blown with an extra flourish. The latter, he told me, is the most prized of all the sacred implements on this side the Snowy Mountains, because of the scantiness of the population, and their short stature, large bones being much coveted for the purpose. In sooth, it takes "a pretty gentleman"* to furnish such a bone as the Lama of Simonbong possessed. Before our departure he presented us with a bamboo-work bowl, thickly varnished and waterproof, containing half-fermented corn and millet. This mixture, called *Murwa*, is invariably offered to the traveller, either in the state of fermented grain, or more commonly in a bamboo jug, filled quite up with warm water, when the fluid, sucked through a reed, affords a refreshing drink. He gratefully accepted a few rupees and trifles which we had to spare. I wanted a blessing in due form, but was rather too much of a sceptic in the matter of the Boodhist trinity, in transmigration, in the efficacy of the "Om mani Padmi hom," and praying-cylinder.

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* It is reported in Darjeeling, that one of the first Europeans buried at this station, being a tall man, was disinterred by the resurrectionist Bhoteas, for his *trumpet-bones*.

I cannot tell how far this was a normal or typical specimen of the Lama worship: the religion is well known now to be essentially trans-Himalayan, especially in the grand features of a hierarchy, and conventual system, both for men and women (monastery, called "goompa," and nunnery). All the offshoots of it, planted on this side of the snow, are liable to be modified by a mingling of the Hindoo worship; and, indeed, the Lama owned to having procured many of his idols from the Hurdwan fair, selecting them with little regard to *breed* or *stock*.

Thibet is still, perhaps, the stronghold of Boodhism, if we regard the number of priests occupied in its worship, proportionably to the mass of the people, the universality of the creed, the nobles being all churchmen, and the splendour of the temples, as compared to the poverty of the inhabitants. In a journal, carefully collected by Dr. Campbell from a Hindoo who travelled from Malva in Western India, through Bhotan into Thibet, and to Lhassa, it appears that in the monasteries of Teshoo Loomboo alone 3,800 Lamas reside, and at Lhassa itself 10,000. Throughout Thibet, the lower class laity alone hold no priestly office, the nobility all to a man do. The Chinese worshippers of Fo (another name for Boodhists) are, of course, incomparably superior numerically to the Thibetans; but the Emperor himself looks to Lhassa, as the spiritual fountain-head of his people's religion. He enjoins no kind of worship on his subjects, has no ecclesiastical bench, supported by Government; and himself, as well as his nobles, are supposed careless to all ordinances of religion, confining their creed to a belief in one supreme being. For the people, a tangible, or at least defineable, object for worship is necessary, and Fo is the choice.

The authority which China exercises over Thibet is, therefore, purely military: she interferes with no other branch of its internal economy; and she exerts a similar influence over the two steppes north of Thibet, that of Little Bucharia, between the Kuen-lun and Thainchan chains, and Altai; the principal hordes scattered over which are of Turkish origin, and Mahomedans. China supplies them with a military force, which occupies all their strong-places, for her own and their reciprocal protection.

With regard to the prevalence of Roman Catholic forms and rites amongst a people whose religion is so much older than Romanism, it is certainly a curious subject. Boodhism, no doubt, originated,* probably as a sort of Brahminism, on this side the Himalaya; the Lhassa monks still looking to India, as the region of their most holy associations and objects, and their symbols, especially the Lotus, being as foreign to a central Asiatic climate as frequent in an Indian one. However it may have sprung, it spread at one time all over India, equally as throughout eastern and central Asia, the wild mountain tribes of the Vindhya and other ranges (especially of the Ghats) alone retaining their more barbarous ritual, as they had done when Brahminism first supplanted the aboriginal creeds, and as they still did when the Brahmins, under the famous Rama, were re-established, and Boodhism was ejected; all of whom (except the heterodox Jains, to whom I alluded when writing of Paras Nath) were put down throughout India, except Ceylon.

Some have supposed the Thibetan Boodhists to be indebted to the Nestorians for most of their Romanist ceremonies: others attribute all to the long-subsequent exertions of the Jesuits. We find the latter, however, bitterly lamenting the similarity in the forms of Boodhist worship and their own; and very naturally would they do so. The Romish creed is so dependent for its influence over simple minds to the imposing ceremonies that accompany it, and especially in its attempts to proselytize, that the familiarity of the Boodhists with similar forms materially crippled their resources. It appears to me not unnatural to suppose that a disposition to monachism may have been self-developed, in a scantily peopled and sterile country, where the disproportion of the sexes is still so great, that several brothers live in harmony with one wife. Such communities of celibates, assuming spiritual power in addition to that which mere combination ensures, might easily keep the poorer classes in subjection, and be the origin of a hierarchy. The mystic nature of the doctrines they inculcate, whether originating wholly amongst themselves, or received from others, and partially concealed by them from the public, would give additional weapons. The system, once established, is quite likely to have adopted many of the forms exercised by the Catholics in their attempts at conversion, and none of which involved any infringement of existing rites. Such an adoption, if the selection were judicious, would weaken the chance of the Catholics, and by so much strengthen their own hands.

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* This is my friend Hodgson's opinion, to whom, I need hardly say, I am indebted for much of this information, and of what follows.

We left Simonbong with the determination of reaching Darjeeling the same day, and accomplished it with some difficulty, for it involved a descent of several thousand feet at once, crossing three intervening spurs, and ascending 5,000 feet more. The *Pteris* grows at Simonbong to fourteen feet high, a greater stature than even in New Zealand, where alone I have seen it attain twelve feet high. The soil is a deep reddish clay, from the decomposition of the gneiss, full of felspar, and tinged with oxide of iron. The hill-sides, where there is or has been cultivation, were perforated with pits, in which the natives have stored roots. We crossed the Little Runjeet much lower down than last week, hoping in vain to avoid some of the fatiguing spurs. Though it did not rain, the mountain-tops were heavily clouded, and the heat (80°) of the valleys proved very trying and oppressive, that of the stream 69°. *Ficus elastica*, *Hoya*, *Chloranthus*, *Marlea*, and some other plants, never leave these hot holes. Passed a *Semul*-tree (*Bombax*) on the spur of Chongtong, elevated about 3,000 feet, which is much the greatest altitude at which I have seen it. This individual tree is a very conspicuous object, even from Darjeeling, from its size and rarity. The last ascent up a steep spur to home, was one pitiless pull, over burnt ground, till we reached 4,000 feet (the forest), where we had plenty of rain and a cooler climate. The clayey soil was very slippery, and so steep that the march was most fatiguing: I scarcely remember being more fagged and thirsty. At 6,000 feet we came on a glorious harvest of the *yellow-fruited bramble*, ripe, and loaded with fruit. I recollect that, when a child at home, prudence forbade the full enjoyment of wild fruit, and that colic sometimes preceded satiety; but of this grateful raspberry any quantity may be eaten with safety, as we did most assuredly prove. Reached Darjeeling by nightfall. The men came up on the following day, four of them ill with fevers, from sleeping in the hot valleys after their previous exposure to damp and cold.

Excursion to the Junction of the Great Runjeet River with the Teesta, on the borders of Bhotan. May 1848.

The Great Runjeet flows from the snows of the southern face of Kinchin (due north of Darjeeling), and winds through deep valleys, till it is turned aside by the numerous spurs of Sinchul. The first of these is that whereon Darjeeling is situated, and which deflects the stream's course for fifteen or twenty miles to the east, where, meeting the Teesta, the combined waters of both rivers flow through a gap of the Sub-Himalaya into the plains. Though both have a snowy source, the Teesta is by far the larger stream of the two, and the most considerable in Sikkim; it rises on the eastern slope of Kinchin, flows a little east, and is turned southward by a lofty long southerly spur of the snowy range. The latter river is supplied by a feeder from the east, called the Little Teesta, before its union with the Great Runjeet, as also by many streams from the high snowed ridges, which reduce its temperature considerably, as I had occasion to notice, at the junction of the two.

May 3rd.—Leaving Darjeeling with Mr. Barnes, I descended the spur to Leebong, one of the two secondary spurs (the easterly) formed by the forking of that whereon Darjeeling stands, which is densely wooded. Leaving the region of *Birch* and *Magnolia*, at a little below 7,000 feet, *Banana*, *Tree-fern*, and *Caryota* all appear, together with large *Araliaceæ*; the *Michelia excelsa* (?) is here replaced by a smaller-flowered species, and the *Wallnut* is common in the woods.*

Below Leebong is the village of Ging, a hamlet, surrounded by steeps, cultivated with *Maize*, *Rice*, *Millet*, and various tropical *Cerealia*. It is rendered very picturesque by a long row of tall poles, each bearing a narrow vertically elongated banner, covered with mystical inscriptions, and surmounted by coronet-like ornaments, or spear-heads, rudely cut out of wood or of basket-work, and adorned with cotton fringe. These are emblems of the Boodhist religion, and held very sacred, though the votaries attached no definite meaning to them. Ging is a village peopled by Bhotan immigrants; and when one dies, if he can afford to pay for them, two additional poles and flags are set up, to propitiate in his favour. Boodhism, Mr. Hodgson tells me, is spreading fast amongst these mountaineers, through the influence of the Bhotea Lamas, who have many temples, and some convents, on this side the snow. The Lepchas profess no religion of their own, though they uniformly acknowledge the existence of good and bad spirits. To the good, they pay no heed: why should we? they say, the good spirits do us no harm;—the evil spirits, who dwell in every rock, grove, and mountain, are constantly at mischief, and to them we must pray, lest they hurt us. Every tribe has a priest-doctor: he neither knows nor attempts to practise the healing art, but is a pure exorcist: all bodily ailments are deemed to be the operation of devils, who are cast out by the prayers and invocations of the priest-doctors. Still they acknowledge the Lamas to be very holy men, whose religion is good, and, were the latter only moderately active, they would soon convert all the Lepchas. As it is, the Rev. Mr. Start, a German missionary at Darjeeling, has made several proselytes to Christianity; but with a wandering people, who have no fixed location even within the narrow bounds of Sikkim, and who never see their spiritual head except at Darjeeling, the task of conversion is not easy.

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* The Sikkim *Wallnut* is thick-shelled, and rather more oblong than the English; that from Bhotan altogether resembles the very best European. I send you a lot, given me by Mrs. Campbell.

Totally destitute of sacred edifices, or of skill and materials to "make him either a temple or a god," the rude Boodhist of these parts, in the absence of any visible object of adoration, sets up such banners as I observed at Ging, in honour of Sunga, the third member of his godhead. The inscriptions on the flags are the mystical and long-disputed sentence, "Om Mani Padmi hom;" or, "I salute him of the Lotus and Jewel;" for such is the interpretation of this much-contested invocation, which has puzzled orientalists, who have known it as the common invocation of the Boodhists, for full 200 years. I am indebted to Hodgson for the translation; its correctness is acknowledged: Sunga, or Pudma Panee, is always represented with a Lotus and Jewel.

The Lepcha houses are tolerably large, framed of bamboo, raised on a stage, and thatched with split bamboos, so as to be quite water-tight: this roofing is very good, and generally adopted by the English. Beyond one gable, the stage is prolonged into a sort of perch, whereon the family are often seen assembled. Inside there are one, two, or more rooms, but containing little furniture. Underneath the house a goodly lot of pigs grunt, and a very fine race of cattle is herded, the latter generally black and white, of the size and somewhat the look of our

Ayrshire kine. The stock is peculiar, differing from that of Nepal and of the plains. The milk and butter they afford is good. Except bamboo, they get no grass, but browse on the leaves of the forest.

A group of Lepchas is exceedingly picturesque. They are of short stature—four feet eight inches to five feet—rather broad in the chest, and with muscular arms, but small hands and slender wrists. The face is broad, flat, and of eminently Tartar character, flat-nosed and oblique-eyed, a sallow complexion, or often a clear olive, no beard, and little moustache; the hair is collected into an immense tail, plaited flat or round. The lower limbs are powerfully developed, befitting genuine mountaineers: the feet are small. Though never really handsome, and very womanish in the cast of countenance, they have invariably a mild, frank, and even engaging expression, which I have in vain sought to analyze, and which is perhaps more due to the absence of anything unpleasing, than the presence of direct grace or beauty. In like manner, the girls are often very engaging to look upon, though without one good feature; they are all smiles and good-nature; and the children are frank, lively, laughing urchins. The old women are thorough hags. Indolence, when left to themselves, is the Lepchas' besetting sin; they detest any fixed employment, and their foulness of person and garments renders them disagreeable inmates of a house: in this rainy climate they are supportable out of doors. Though fond of bathing when they come to a stream in hot weather, and expert, even admirable swimmers, these people never take to the water for the purposes of ablution. In disposition they are amiable and obliging, frank, humorous, and polite, without the servility of the Hindoo; and their address is free and unrestrained. Their intercourse with one another and with Europeans is scrupulously honest; a present is divided equally amongst many without a syllable of discontent, or grudging look or word: each, on receiving his share, comes up and gives you a brusque bow and thanks. Already they have learnt to overcharge, and use extortion in dealing, as is the custom with the people of the plains; but it is clumsily done, and never accompanied with the grasping air and insufferable whine of the latter. Though constantly armed with the long knife, they have never been known to draw it on one another: family and political feuds are alike unheard of amongst them. In morals the Lepcha is "integer vitæ scelerisque purus," thus differing widely from the vices of the neighbouring people, especially the natives of

Bhotan, amongst whom polyandry prevails, and the convent system is carried to such an excess, that all ties of relationship and morals are gone. Like the New Zealander, the Tasmanian, the Fuegian, and the natives of other climates, which, though cold, are moist and equable, the Lepcha's dress is very scanty, and when we are wearing our woollen under-garments and hose, he is content with one cotton vesture, which is loosely thrown round the body, leaving one or both arms free; it reaches to the knee, and is gathered round the waist: its fabric is close, the ground-colour white, universally ornamented with longitudinal blue stripes, two or three fingers broad, prettily worked with red and white. When new and clean, this garb is remarkably handsome, and gay, but not showy. In cold weather an upper garment with loose sleeves is added. A long knife, with a common wooden handle, hangs by the side, stuck in a sheath; he has also, often, a quiver of poisoned arrows and bamboo* bow across his back. On his right wrist is a curious wooden guard for the bowstring; and a little pouch, containing Aconite poison and a few common implements, is suspended to his girdle. A hat he seldom wears, or, if he does, it is an extravagantly broad, flat-brimmed one, with a small hemispherical crown. It is made of leaves of *Scitamineæ*, between two thin plates of bamboo-work, clumsy and heavy; his umbrella I explained before. All the Lepchas are fond of ornaments, wearing silver hoops in the ears, necklaces made of amber and turquoise, brought from Thibet, and coral from the south, with the curious silver mystical emblem of Boodhism, sometimes as large as a wallnut. In these decorations, and in their hair, the poor creatures take some pride; the ladies often dressing the latter for the gentlemen. In their houses you may often see, the last thing at night, a damsel of discreet port, demurely go behind a young man, unplait his pig-tail, teaze the hair, thin it of some of its lively inmates, braid it up for him, and retire.

In diet, they are gross feeders.† Pork is a staple dish, and when travelling they live on the fruits of the earth, animal or vegetable. Fern-tops, roots of *Scitamineæ*, and their flower-buds, various leaves, it is difficult to say what not, *Boleti* and *Agarici*, are chopped up, fried with a little oil, and eaten. They drink out of pretty wooden cups, or quaighs, turned out of maple-knots, or other woods. Their intoxicating drink, which seems more to excite than to debauch the the mind, is partially fermented Murwa grain (*Eleusine Coracana*). Spirits are rather too strong to be relished raw, and when I give a glass of wine to one of a party, he sips it, and hands it round to all the rest. A bamboo flute, with four or six burnt holes, is the only musical instrument I have seen in use among them. When travelling, and the fatigues of the day are over, the Lepchas sit for some hours chatting, telling stories, singing in a monotonous tone, or blowing this flute. In the latter I discover no air, the performance is merely a modulated *twho-twho,* singularly harmonious in expression, both plaintive and pleasing in these wild forests; all like to listen to it, and his must be a dull ear who cannot draw from it the indication of a contented mind, whether he may relish its soft musical notes or not.

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* The quiver bamboo is rare, from its thinness of parietes, and consequent lightness; it is brought from Bhotan.

† Campbell's definition of the Lepcha's *Flora cibaria* is, that he eats, "or must have eaten, everything soft enough to chew; for, as he knows whatever is poisonous, he must have tried all:" his knowledge is wholly empirical.

Though always equipped for the chase, I fancy the Lepcha is no great sportsman: there is little to be pursued in this region, and he is not driven to follow what there is, by dire necessity, nor is there game enough to encourage a taste for sporting.

Such are some of the prominent features of this people, who inhabit the Sub-Himalayas between the Nepalese and Bhotan frontier, at elevations of 3,000–6,000 feet. In their relations with us, they are conspicuous for their honesty, their power as carriers, and mountaineers, and their skill as woodsmen, for they build a waterproof house with thatch of banana leaves in the lower, or bamboo in the elevated regions, and equip it with table and bedstead for three persons, in an hour, using no implement but the heavy knife. Kindness and good humour soon attach them to your person and service. A gloomy-tempered or morose master they avoid, an unkind one they flee. If he be a good hills-man like themselves, they will follow him with alacrity, sleep on the cold bleak mountain, exposed to the pitiless rain, without a murmur, lay down the heavy burden to carry the master over a stream, or give him a helping hand up a rock or precipice,—do anything, in short, but encounter a foe, for I believe the Lepcha to be a veritable coward.* It is well, perhaps, he is so; for if a race, numerically so weak, were to embroil itself, even by resenting the injuries of the warlike Ghorka, or dark Bhotanese, the folly would soon lead to destruction.

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* And yet, during the Ghorka war, they displayed many instances of courage,—when so hard-pressed, however, that there was little choice of evils.

As yet I know little of the other races inhabiting Sikkim, the Limbos, Murmis, and Mechis, nor of the Ghorkas, Bhotanese (of Bhotan), and Bhoteas of Thibet (the three last are immigrants, respectively from the west, east, and north); when I do, I will give you some little sketch of them.

(*To be continued.*)

MR. SPRUCE'S *Voyage up the* AMAZON *River; extracted from a letter dated Santarem, November* 15, 1849.

[If we may judge from the uncommon interest that has been manifested of late in the living specimens of *Victoria regia*, with the sight of which the public have been so liberally indulged in this country by the noble Dukes of Devonshire and of Northumberland, the following account of Mr. Spruce's visit to one of the native localities of the plant will be very acceptable to our readers. They will learn from it, if the reports made to that gentleman be true, that the largest leaves yet produced in our country (five feet two inches across), are but dwarfs compared to what they are in the lakes communicating with the mighty Amazon river, during the *wet season*; and that the deeper the water in which this truly royal plant is cultivated, the more luxuriant will be the foliage and the flowers.—ED.]

I seize the opportunity of a vessel sailing to-day for Parà to write a brief letter, and to forward specimens of the flowers and leaves of the *Victoria regia* in a barrel of spirits. We reached Santarem on the 27th ult., after a favourable voyage, although twelve days out of seventeen were taken up by the first half of the distance, so tedious is the task of threading the narrow channels that connect the mouth of the Tocantins with the Amazon. I have not time to enter into details, and can only say that I seized every opportunity of landing, whenever the montaria was sent ashore to cut wood, or when we anchored during the day; but this was rarely in such spots as I would myself have selected, and those hasty excursions were not always productive. The Canal de Tajipurú, which separates the great island of Marajó from the mainland, contains numerous water-plants, but scarcely any were in flower. I got only a superb *Pontederia*, or perhaps *Eichhornia*, with very large flowers, and leaves almost exactly orbicular. The floating masses of *Pontederiæ*, frequent in the bays of this channel, had generally inflated petioles, but I have seen terete and inflated petioles rising from the same root, and the inflation seems merely assumed to suit the natant habit. In all these species, and in another very pretty one gathered in lakes near Santarem, I observe the fibres of the root to be capped by a sort of calyptra, as I believe you have yourself remarked in some of this tribe. I made out the existence of at least one real *Willow* on the shores of the Amazon, for I have procured both its flowers and fruit; another willow-like tree I could get only in leaf.

The crew of our vessel consisted almost entirely of Tapuya Indians, with whom I had frequent conversations respecting the plants of the environs of Santarem. Amongst others, they told me of a wonderful water-plant, called, in *lengua geral,* 'Oapé,' but in Portuguese, 'Furno,' from its leaf resembling in shape and size the mandiocca-*furnaces* of this country. They added, that the leaf was purple on the underside, where it was also furnished with numerous spines. This description could refer to no other plant than the *Victoria,* and I was confirmed in this conclusion by further testimony when I arrived at Santarem. Here nearly everybody had seen the 'Furno,' and some wondered I should inquire so eagerly about a plant which they had known for the last forty years, and never dreamt to be anything rare. Our countryman, Captain Hislop, one of the oldest settlers at Santarem, had, however, ascertained the plant to be the *Victoria,* from an account of Schomburgk's discovery of it in Guiana, which he had seen in some review. As soon as I conveniently could, I planned an excursion to one of the stations, a lake in the Ilha Grande de Santarem, the largest island of the archipelago formed by the junction of the Amazon and Tapajoz. In this I was materially aided by Mr. Jeffreys, another countryman, who not only lent me his galiota, but also accompanied me. We started early, and it took three hours' pulling with six oars to reach the opposite shore. We disembarked at a sitio, the nearest point to the lake, whither we were now to proceed overland; but we were told that the intervening campo had not yet been fired (as is usual in the dry season), and that it was clad to the depth of six feet with rank grasses and bushes, so as to be quite impassable. We were advised to land at another sitio, a little farther down, where we should find a path leading through the woods to an igarapé, communicating with the lake. Following this advice, we at length reached the igarapé, and were at once gratified by seeing the *Victoria* growing by the opposite shore of the igarapé itself. This was the more satisfactory, as the day was already far advanced, and the montaria, which we found in the igarapé, could only take two persons at once, while our party consisted of six, so that there was small prospect of reaching the lake. We lost no time in crossing to the other side, where I sent a man to the outer edge of the mass of plants, while Mr. King and I waded into the water to cut the leaves and flowers, which he towed round to the landing-place. We were warned by the people not to go amongst the plants, as their prickles were venomous; but I got both hands and feet considerably pricked without experiencing any ill effects. We were fortunate in finding the plant in good flower, but, according to the testimony of all at Santarem who have seen it, the leaves attain their greatest dimensions in the winter. Captain Hislop assures me he has seen many leaves twelve feet in diameter, whereas the largest we saw measured a very little above four feet across, and they were packed as close as they could lie. But I can easily conceive how, in the wet season, their dimensions should be considerably augmented, for whereas at present the plant is growing in less than two feet of water, in winter the igarapé will be filled to its topmost banks, or at least fifteen feet deeper than at present, while its breadth will also be greatly increased; so that the petioles of the *Victoria*, lengthening doubtless with the rise of the waters, will bring the leaves to a much greater surface, on which they will have room to dilate to above twice their present size. I cannot doubt of the fact, having the witness of many competent observers, but I hope one day to ascertain it by personal observation. I enclose a note from Dr. Campos, the Juiz de Direito at Santarem, in which he alludes to the immense size which the leaves attain. Dr. Campos is a gentleman of remarkable acquirements for so remote a part of the world; he reads English and French perfectly, and, as you will see, writes the former quite intelligibly.

The aspect of the *Victoria* in its native waters is so new and extraordinary, that I am at a loss to what to compare it. The image is not a very poetical one, but assuredly the impression the plant gave me, when viewed from the bank above, was that of a number of tea-trays floating, with here and there a bouquet protruding between them; but when more closely viewed, the leaves excited the greatest admiration from their immensity and perfect symmetry. A leaf, turned up, suggests some strange fabric of cast-iron, just taken out of the furnace; its colour, and the enormous ribs with which it is strengthened, increasing the similarity. I know not whether I can add anything to the elaborate descriptions which have been given, by yourself and Dr. Lindley, of the *Victoria*, but the following observations, made on the fresh plant, may be interesting.

I could find no prostrate trunk, as in the other *Nymphæaceæ.* The root is central, the thickness of a man's leg, penetrating deep into the mud (we could not dig to the bottom of it with our trésados), and sending out fascicles of whitish radicles, about twenty-five, from below the base of each petiole, the thickness of a finger and two feet or more in length. The radicles are imperforate, and give out here and there a very few slender fibres.

Leaf orbicular, but emarginate at the extremity of the shortest radius, the margin suddenly inflexed at nearly a right angle, so as to resemble the brim of a Spanish sombréro. Stomates numerous, margined with red. The underside of the leaf is of a crimson colour, with minute yellow spots, and it is everywhere, on the ribs and on their interstices, pubescent with minute, pallid, jointed, inflexed hairs. Petiole slightly excentric, with two or three wide perforations near the centre, and with several others which become more minute as they approach the circumference. The peduncles are similarly perforated.

Sepals usually four, sometimes five, nearly equal, and sometimes four larger and two interposed and opposite smaller ones; at first green externally, but gradually changing to dull purple. Petals at first white; the innermost alone having on their inner face a few streaks and spots of red, afterwards changing to light lake-red, and finally to purplish-red, exactly the colour of one of our oldest double red roses. The process of bleaching commences with the edges of the outer petals, and in decaying the whole flower rapidly turns to a dull yellow.

Anthers from the first of a bright lake-red. The lobes of the stigma are, when young, of a beautiful purple on their anterior edge and upper part, the lower part being vermilion; afterwards they turn yellow.

At the angles of the air-cells of the radicles, and in the lobes of the stigma, are certain bodies resembling fascines, consisting of slender spines standing out on every side from a short central column. Possibly other tissues of the plant contain these bodies, but I could not detect them in the leaf-stalk.

From the same root I have seen flowers uniting the characters of

Victoria regia and *Creutziana* (of the latter I have only the brief description in Walpers), so that I can hardly doubt their being the same species, as had been already more than suspected.

The igarapé, where we gathered the *Victoria*, is called Tapiruari. I had two flowers brought to me a few days afterwards from the adjacent lake, which seems to have no name but that of the sitios on its banks; Mr. Jeffreys has also brought me flowers from the Rio Arrapixuna, which runs into the Tapajoz above Santarem, and in the wet season unites the Tapajoz and Amazon. I have further information of its growing abundantly in a lake beyond the Rio Mayaca, which flows into the Amazon some miles below Santarem. Mr. Wallace, who recently visited Monte Alegre, had a leaf and flower brought to him there; I have seen a portion of the leaf, which he dried. Lastly, I have correct intelligence of its occurring in the Rio Trombétas near Obidos, and in lakes between the rivers Tapajos and Madeira, so that there can be no doubt of its being plentifully distributed throughout the whole of this region, both north and south of the Amazon.

The vegetation around Santarem offers a great contrast to that of Parà. Instead of the interminable plains and forests, uninterrupted save by intersecting rivers, of that district, we have here sandy elevated campos, rising, as they recede from the rivers, into picturesque though not lofty sierras, and clad with short herbage, with here and there groups of gaily-flowered shrubs, precisely recalling the park-scenery of some parts of England. Amongst these shrubs the famous *Suca-úba* (*Plumiera phagadenica*, Mart.) is one of the most frequent; I have got ripe seeds and young plants of it. The white flowers are, unfortunately, very fugacious, otherwise it is a very handsome-growing shrub. There are, besides, some interesting *Rubiaceæ*, some very curious *Euphorbiaceæ*, and the *Melastomaceæ* are more showy than those near Parà: one is a small plant three or four feet high, with large purple flowers—it is possibly a *Pleroma*, but seems different from any I have seen cultivated in England; another, a compact-growing shrub with large panicles of most beautiful flowers, in which the white petals, the yellow anthers, and the scarlet filaments and connective are well contrasted. Yet though I have had ample occupation with my dried and other collections since my arrival, a very large proportion of the plants seem to flower only in the wet season, and the campos are every day becoming more and more burnt up. Mr. Wallace gives the same account of Monte Alegre, and I have the same information respecting Obidos. In the month of May, the Sierras of Santarem are said to be a complete wilderness of flowers, and I am seriously thinking of proceeding now to the Barra of the Rio Negro, and of revisiting this district in the wet season. Another reason that seems to call on me to change my station is, that the surrounding country is almost entirely destitute of *Orchideæ* and Ferns. We have got three species of each tribe which we did not notice at Parà, and of the former all are out of flower. Of course I cannot call into existence any tribe of plants I wish; but if I cannot send *Orchideæ* to Mr. Pince, I hope I have some other things here which will not be beneath his acceptance. The climate of the Rio Negro is said to be always moist (here it is very dry), so that I hope *Orchideæ* and *Ferns* may flourish there. Santarem is an excellent station in many respects. I can easily make trips from it to Monte Alegre or Obidos: living is cheap and good, groceries and house-rent alone are dear; and there is frequent communication with Parà; but winter is evidently the season for it. If I get to the Barra, I shall not like to come down again before I have visited Mount Maravaca and the Cerro Duida, but I fear my funds will not enable me to do this.

I have had an interview with the Vigario of Santarem, respecting the crucifix sent here by Dr. Von Martius. The statue and inscription (which I have seen) are safe and sound, and a cross has been made to receive the former, but none of them is put up yet. The vigario tells me that they have no instructions from either Von Martius or the President of the province, as to who is to bear the expense of erecting this monument; that the inhabitants of Santarem have already subscribed to purchase the cross, which is all that so small and poor a town can afford to do; that there is only one place in the church fitted for the reception of it, and that even here the recess would have to be cut larger, and a good deal of iron, wood, and mason-work would be required to support the whole properly. He estimates the expense at two or three hundred milreis.

A messenger has called to hasten my letters.

RICHARD SPRUCE.

The barrel contains one full-grown leaf, and one about half unrolled, of the *Victoria*, with flowers in all states and sections of the root, all carefully packed in banana leaves. The barrel, spirits, and carriage to Parà, cost me very nearly a pound.

BOTANICAL INFORMATION.

Letter from Mr. BERTHOLD SEEMANN, *Naturalist of H.B.M. Surveying-ship* HERALD, *addressed to Sir W. J. Hooker, after the return of the Herald from the second voyage in search of Sir John Franklin, by the way of Behring's Straits, and dated Mazatlan, Mexico, Nov.* 13, 1849.

(*Continued from p.* 158.)

Having now completed the outline of our proceedings in the north, I will add a few general remarks on the north-west coast of America: a more elaborate account must be postponed.

The whole country, from the southern extremity of Behring's Straits to Point Barrow, is a vast moorland, whose even level is only interrupted by a few promontories and isolated mountains. The soil, in most parts consisting of a rich clay, is always frozen a few feet below its surface, to which circumstance, more than to any other cause, the peculiar nature of the country must be attributed. The rain and snow-water, prevented by this frozen mass from descending, form numerous lagoons, or, where the formation of the ground opposes this, bogs, whose general aspect and vegetation do not materially differ from those of northern Europe. A dense mass of Mosses, Lichens, and othes uliginous plants cover the soil, the most common of which are *Ledum palustre*, *Arbutus alpina*, *Vaccinium uliginosum*, *V. Oxycoccos*, *Rubus Chamæmorus*, *Betula nana*, *Cetraria Islandica*, *Sphagnum angustifolium*, &c. &c. Places less crowded with plants are sometimes difficult to pass. The ground is soft, and covered with isolated tufts of *Eriophorum capitatum*. In walking over them, some give way, or the foot slides, and then sinks into water or mud, from which it has often difficulty to extract itself. Wherever drainage exists, either on the shores of the sea, the banks of rivers, or the slopes of hills, the clay is free from peat. Such localities are generally clad with a luxuriant herbage, and produce the rarest, as well as the most beautiful plants.

The gaiety of the vegetation in some localities is very striking, even to one acquainted with the brilliancy of the equinoctial, and familiar with the robust nature of the temperate zone. Many flowers are large, their colours bright, and, though white and yellow are the predominant, those displaying other tints are by no means uncommon. Among the flowering plants hitherto detected, the colours are thus distributed. The prevailing tint of the floral envelopes is greenish-yellow in fifty-three species, white in fifty, yellow in thirty-six, purple in twenty-five, blue in fourteen, rose-colour in ten, and red in one. It is remarkable that red occurs in only one solitary instance, and that scarlet is entirely wanting. Some allowance has to be made for the first division, greenish-yellow, which includes all plants with imperfectly developed floral organs, viz., many *Monocotyledones*, the *Amentaceæ*, and other apetalous forms. Besides this, there are other discrepancies. From various causes, several species change their colour. *Lychnis apetala*, for instance, when growing in clay or sand, bears white, when in peat, purple flowers. *Papaver nudicaule*, also, alters its colours, of which, however, not soil, but temperature seems to be the cause. In Kotzebue Sound, and other sub-arctic parts, it is yellow; towards Point Barrow almost invariably white; and, if I recollect right, the specimens brought to England by Captain Parry, from Melville Island, as well as those collected by Dease and Simpson at Point Barrow, were also white. In another *Papaveracea* I noticed the same change. *Argemone Mexicana* is, around Lima and the temperate parts of Ecuador, white; in the torrid regions of New Granada, Central America, and Mexico, yellow; while at the Sandwich Islands, which enjoy a cool climate, it is again changed into white. [Are not these distinct species? Ed.]

An essential difference exists between the Flora of the sub-arctic and that of the arctic region. The sub-arctic flora is characterized by the presence of forms which grace the plains of the temperate zone. Most of the genera are represented by only a single species; and many, whose focus is in more southern latitudes, extend their range close to the Arctic circle, though few venture beyond that limit. The principal are:—*Ribes*, *Rosa*, *Lupinus*, *Aconitum*, *Sanguisorba*, *Thalictrum*, *Delphinium*, *Viola*, *Corydalis*, *Spiræa*, *Andromeda*, *Pyrola*, *Valeriana*, *Solidago*, *Campanula*, *Galium*, *Pinguicula*, *Abies*, *Cistopteris*, *Nephrodium*, *Marchantia*, &c. The vegetation of the Arctic circle is chiefly distinguished by the prevalence of alpine plants, the pride of mountains of more genial climes. All are low and dwarf, many tufted, forming dense masses. The most numerous natural orders are *Saxifrageæ*, *Alsineæ*, and *Compositæ*. Among the genera are the following:—*Dianthus*, *Sieversia*, *Dryas*, *Anemone*, *Artemisia*, *Saxifraga*, *Alsine*, *Lychnis*, *Myosotis*, *Cassiope*, *Oxyria*, *Primula*, *Androsace*, *Dodecatheon*, *Phaca*, *Oxytropis*, *Tofieldia*, *Anthericum*, &c. &c.

Plants reach their extreme north in the centre, not on the coast of a continent. From the highest northern point the line describing their limit descends towards south-east and south-west. In the Old World, trees grow as high as latitude 70° north, while towards the eastern shores of the same country none exist as far south as latitude 64° north (personal knowledge and observation). In the New World the same rule holds good. In the centre of the American continent the limit of the woods is in the Arctic circle itself; on the western coast it is thirty-three miles below it, in latitude 66° north. The most northern trees of this coast are *Abies alba* and *Salix speciosa*. About Norton's Sound, groves of *Coniferæ* are frequent, but gradually they become less abundant, till in latitude 66° north, on the banks of the Buckland, *Abies alba* entirely disappears. *Salix speciosa*, though still ascending above that degree, is no longer a tree, and is only able to reach, in sheltered positions, the height of six feet. *Betula incana* extends as far as Kotzebue Sound, where, in valleys and on the slopes of hills, in company with *Salix Lapponum* and *Salix n.* 1789, it forms low brushwood. With the commencement of the Arctic circle, *Salix speciosa*, *S. Lapponum*, and *Betula incana* cease to exist: *Salix n.* 1789 extends its range further, but is only for a short distance able to maintain the ground. At Cape Lisburne, in latitude 68° 52′ 6″ north, it is, in the most favourable localities, never higher than two feet, while its cracked growth, and the numerous abortive leaf-buds, plainly indicate that it is struggling for existence. All attempts of spreading its dominion towards the north prove unsuccessful. Two degrees higher, and it is seen no more. At Wainwright's Inlet a boundless plain presents itself. No tree interrupts the uniform line of the horizon; no shrub dares to show itself above the level of the turfy vegetation; all ligneous remains are closely prostrated to the ground, and only maintain life by seeking shelter among the Mosses and Lichens. The polar wind, which never affects the graceful palm, and is incapable of injuring the hardy oak, yet at last succeeds in laying low the offspring of Flora in these regions. Here they are doomed to slumber two-thirds of the year, without sun, without warmth, in an icy bed, till the return of the great light has restored the brightness of day, and again enabled them to resume, for a few weeks, the busy operations of organized beings.

The remaining portion of our voyage may be told in a few words. The month of September was drawing to its close; the weather, which up to this time had been moderate, became boisterous; boats could seldom attempt to land; so that, after my return from the Buckland river, few opportunities occurred to get on shore. The Plover had selected the east side of Chore's Peninsula for a winter-quarter; and as the rapidly declining temperature and the frequent snow-storms plainly told the fast approach of winter, the Herald and Nancy Dawson left Kotzebue Sound on the 29th of September, 1849. At our departure, the boats from the Mackenzie river had not yet returned, and no information whatever had been obtained respecting the fate of Sir John Franklin's expedition, or that of Sir John Richardson. On the 11th of October we passed through the chain of the Aleutian Islands, whose conical shapes betray their volcanic origin. Sighted the Isle of Guadeloupe on the 3rd of November, and anchored on the 13th of the same month in the port of Mazatlan, Mexico.

BERTHOLD SEEMANN.

The following is the addition made to the herbarium. The species collected at Oahu are n. 1693–1734; at Petropaulowski, n. 1735–1747; on the north-west coast of America, n. 1747–1915; and at Herald Island, n. 1915–1922.

Since the 19th of March, 1849, I have been on the collecting ground—at Oahu five days, at Petropaulowski one, Chamisso Island two, Wainwright Inlet two, Herald Island one, Cape Lisburne one, Kotzebue Sound six, and Buckland River five. What I have called a day is in most cases only a limited portion of such, half an hour, one hour, &c.

Total number of days spent collecting, from the 19th of March to the 13th of November, 1849: 21.

Total number of days spent at sea, from the 19th of March to the 13th of November, 1849: 219. B. S.

Fitch del et lith

R. B. & R. imp.

African Oak.
Oldfieldia Africana

AFRICAN OAK (OR TEAK).

TAB. VI.

As in India the most celebrated tree for ship-building (*Tectona grandis*) is called *Teak*, or *Indian Oak*, so a timber of the West Coast of Tropical Africa, long known for its qualities in naval architecture, and long and largely imported into this country, goes commonly by the name of *African Teak* or *African Oak*. But, notwithstanding the extensive use made of this tree, and our familiarity with its wood, the botanical characters have been (and still are, in a measure) hidden from us. Our ignorance has not, however, arisen from indifference, or a want of inquiry; for years past, many individuals, and none more than our valued friend Sir William Symonds, late Surveyor-General of the Navy, have been diligent in endeavouring to obtain, and travellers and merchants have sought, the needful information; but from the fact of the trees being felled far in the interior, and the persons engaged in the operation being ignorant natives, no information that could be depended upon was obtained. *Various* specimens of foliage, indeed, had been sent to ourselves and others as the African Teak; and this very circumstance showed that they had been carelessly gathered, and that we possessed no clue to the right kind. Dr. Vogel's attention, during Captain Trotter's late 'Expedition to Explore the Niger,' was directed to the subject; yet even he, anxious as he must have been to prosecute the needful inquiries, was only able to obtain a single leaf (no flowers or fruit), brought down by a native from the River Sann, to Captain Trotter, as the "African Oak," or "Teak." "So that," continues Mr. Bentham, in 'Niger Flora,' p. 487, "the wood, long employed in our navy under the name of African Oak, or African Teak, is a remarkable instance of a highly valuable and most extensively-used timber, of which the tree that supplies it is wholly unknown to science. Botanical collectors have frequently made it the object of their researches and inquiries; but, on the one hand, no botanist appears to have actually visited the forests which furnish it; and, on the other, the natives who have brought leaves as from the trees, either by ignorance or carelessness, or more probably from ill-judged interested motives, have evidently, in most cases, deceived us. Thus, we have heard that among various leaves presented to Mr. Brown, as found amongst the timber, the principal part appeared to be those of a *Laurinea*. The plant brought home by the Earl of Derby's collector, and now in Kew Gardens, is too young for us to determine, but looks more like a Sapotaceous plant. The greater probability, however, is in favour of the *Vitex*-looking leaf given to Captain Trotter: it is perfectly smooth, palmately compound with six (probably seven, of which one is lost) folioles, of which the longest are above five inches long, and much narrowed at both ends. With every appearance of a *Vitex*, it is quite distinct from any described species."

Flowers and fruit, as far as we know, had never been attempted to be sent. At length, in March of the present year, we had the satisfaction to receive foliage and fruit from Richard Albert Oldfield, Esq. (Marshal of the Mixed Commission and Vice-Admiralty Courts at Sierra Leone, long resident there and at Fernando Po, and largely engaged in mercantile affairs), accompanied by a letter, assuring us of the difficulties that attended the obtaining of specimens from the interior, where alone they are procurable; but promising to send again into the "bush," at the proper season for flowering specimens, in May and June. In the meantime, we are anxious to give all the information we at present possess relating to this valuable tree; and it is very satisfactory to find that the leaves now sent are identical with those in Dr. Vogel's collection, above alluded to. We immediately placed our materials, such as they are, in the hands of Mr. Bentham, and he had little hesitation in pronouncing the *leaves* and *fruit* to belong to a new form of *Euphorbiaceæ*, and none in considering the latter indicative of a new genus of plants, to which we propose to give the name of the gentleman who has so successfully exerted himself to procure the specimen.

OLDFIELDIA, *Benth. & Hook.*

Nat. Ord. EUPHORBIACEÆ?

Capsula subtriquetro-globosa, trilocularis, loculicide trivalvis; valvulis sublignosis medio septiferis integris columnam centralem seminiferam nudantibus. *Semina* in quoque loculo gemina, collateralia, v. abortu solitaria, ex apice columna centralis pendula, obovata, compressa, hilo prope apicem laterali affixa, exarillata. *Testa* coriacea, lævis; *albumen* cartilagineum; *cotyledones* planæ, foliaceæ, subquadratæ, albumine vix breviores, *radicula* brevissima supera erecta.—Arbor, foliis digitatis, foliolis *in petiolum auriculatis*.

OLDFIELDIA AFRICANA, *Benth. & Hook.*

Foliorum *petiolus communis* tenuis, 4–6-pollicaris, pube minutissima fuscescens, dorso infra foliolorum insertionem glandulis 2 parvis obliquis instructus. *Foliola* 5–7, majora, 4–6-pollicaria v. longiora, breviter petiolulata, oblonga, acuminata, basi longe angustata, submembranacea, penninervia et reticulato-venosa, glabra, impunctata et eglandulosa, lateralia minora et proportione latiora. *Capsulæ* pedicello semipollicari fultæ, 9–10 lin. diametro, vertice obtusissimæ, glabræ, læves, lateribus (ad dehiscentiam) leviter sulcatis.

The structure and insertion of the seeds, and the general appearance of the fruit, point at once to *Euphorbiaceæ*, and the seeds, or at least the ovules, in pairs in each cell, to the tribes of *Buxeæ* or *Phyllantheæ*, as the most probable affinities of this genus, the flowers being as yet unknown. The dehiscence of the capsule is, however, totally different from that of any other genus familiar to me; for even in *Omalanthus*, where the dehiscence of the pericarp is loculicidal, the endocarp separates into two cocci, and the furrows of the fruit correspond to the dissepiment; whilst in *Oldfieldia* there is not the slightest external mark corresponding to the dissepiments, the furrows are opposite the middle of the cells, and the dissepiments themselves are thin in proportion to the valves, and remain attached to the valves as they open, breaking off irregularly from the central column, which remains free, and bears the seeds, as in other *Euphorbiaceæ*.—*Benth.*

We did not fail to sow some of the seeds immediately on their arrival, and they have now begun to germinate. At the time our plate was prepared, the seedlings exhibited the appearance represented at Pl. VI. fig. 1. The plumule has since become more developed, and already exhibits alternately arranged leaves, as might be expected in plants of the Natural Order *Euphorbiaceæ*.

It is to be regretted that no precise localities have yet been stated for the *Oldfieldia*. It does not appear to inhabit the coast, and is probably common in the forests, or what at Sierra Leone is called "bush," in the interior. We have sought, hitherto, in vain, for any published account of the commercial value or naval adaptations of the timber of this tree, but we have received some interesting particulars from our valued friends, Captain Sir William Symonds, the late Surveyor-General of the Navy, and from John Edge, Esq., F.R.S., the present Deputy-Surveyor of the Navy, which cannot fail to be interesting to our readers, and with which we shall close our remarks for the present, feeling sure that what we have here given will be the means of eliciting much more valuable information on this important subject.

It was about the year 1819 that the value of *African Oak* or *Teak* was first experienced in the British Navy, and it has proved of the highest importance for certain parts of a vessel. The Nimrod, a 28-gun ship, is built of it; but the weight of the wood is much against it as a material exclusively, and, of late, its use has been confined to beams, keelsons, waterways, shelf-pieces, and framing of bitts, &c.; so that, in the opinion of many, for such purposes no timber is comparable to it, except the "Sabicu" (*Acacia formosa*, H.B.K.), from Cuba. The juice or sap of the wood is bitter, not, like that of oak, acid; on which account its contact with other timber is less pernicious, the sap of oak being very destructive in that way. It is, however, heavier than either *English Oak* or *Indian* (*Malabar*) *Teak*. The average of many experiments gives for *English Oak* and *Malabar Teak*, when seasoned, about 49 lbs. to the cubic foot; while the specific gravity of *African Oak* is more than 60 lbs. (often 70 lbs.) to the cubic foot. The *African Oak*, again, is by far the strongest of these woods, and requires nearly one-third more weight to break it than either *English Oak* or *Malabar Teak*; while *Sabicu* is nearly of the same strength. "*Greenheart*" (Nectandra Rodiæi, *Schomb. in Hook. Lond. Journal of Botany*, vol. iii. p. 626) is indeed one-third stronger than *African Oak*, but its qualities are little known as yet from experience. *African Oak* rots in warm, damp, and confined situations; while *Indian Teak* and *Sabicu* are durable under such circumstances, and, indeed, almost imperishable.

Tab. VI. Leaf of *Oldfieldia Africana*. Fig. 1. Seedling plant, about a week old; fig. 2. fruit; fig. 3, ditto with one valve removed, showing two of the seeds, corresponding with the two cells in the valve; fig. 4, 5, seed:—*all nat. size*; fig. 6, section of a seed; fig. 7, transverse section of the albumen and cotyledons; fig. 8, embryo, slightly magnified.

NOTICES OF BOOKS.

Essai de Phytostatique, *appliquée à la chaîne du* Jura *et aux Contrées Voisines, &c. Par* Jules Thurmann, *Ancien Directeur de l'Ecole normale du Jura bernois, &c.*

Phyto-Statistics *of the* Jura *Chain and neighbouring Countries; or, the Distribution of Vascular Plants, considered chiefly with relation to the subjacent rocks. By* Jules Thurmann.

Such is the title, and such are the contents, so far as the title can indicate their contents, of two closely-filled volumes, which are well deserving of attention from all botanists who take interest in that branch of their science which connects together the facts of vegetable distribution and those of physical geography. The author's researches have been directed to the botany of a comparatively small district, and one that has been trodden over repeatedly by the footsteps of countless collectors and describers of plants. But he has observed nature from a different point of view, closely and independently; and he has thus acquired a store of knowledge, which has enabled him to write an original essay on the botany of a country that had been exhausted of novelty in the eyes of the less inquiring.

The volumes of M. Thurmann may be said to afford another example of a circumstance which is an exception to the usual tendency of the English race. Notwithstanding the advanced position commonly sustained by the people of this country in most matters of science and art, it is nevertheless true, that the botanists of England have almost invariably to look to those of other countries for such works on their special science as are characterized by any remarkable originality of thought and method, or in which the spirit of progress is manifested by some decided novelty of manner and form in treating a subject not new in itself. English botanists can repeat, or copy, or imitate very successfully, but they do not often originate new views and improved modes; they do not discover and invent in botany. They can detect and observe, can depict and describe, can catalogue and group individual facts and objects; but they do not connect their data, thus acquired, by the theoretic relations of cause and effect, nor do they often generalize their details, so far as to elevate these into the category of scientific principles.

With certain reservations, the essay of M. Thurmann may be cited as an example of the opposite kind. It is truly a new work, in method and matter, and not simply a new book after an old model. The novelty, however, here lies rather in the form and manner of treatment, than in any originality of conception otherwise. It is geographical botany on a very local scale, as respects the extent of country under the author's consideration, elaborated with great copiousness of statement and explanation; but it is worked out with sufficient combination and connectedness of the details, to give to the publication far more than a merely local interest and value. The faults of the essay may lie mainly in the want of greater condensation, if regarded as a work for the instruction and use of distant botanists. No doubt, a multitude of details are compressed into comparatively small space of print, by using certain regular series of single letters instead of words at length; as, for example, the letters "*d. t. l. J.*," or "*d. t. l. c. a.*,' instead of the words "*dans tout le Jura*," or "*dans toutes les contrées ambiantes*:" but this is compression in space, rather than condensation of thought and information.

M. Thurmann has felt the usual inconvenience of writers who treat a subject under a new form or from a new point of view, by not finding any suitable name for indicating the contents or purpose of his work among those in current use with botanists. His first volume treats of the physical peculiarities of the area to which his work relates, the local variations of its flora and vegetation in connection therewith, comparisons between the botany of this special area and that of surrounding countries, with many other matters. The second volume includes a systematic enumeration of the plants of the Jura, with the geographic and topographic distribution of each species treated separately and in considerable detail. This second volume thus bears some generic resemblance to the volumes of the 'Cybele Britannica,' as far as the latter work has been yet published; while the first volume has some similitude with an earlier publication, by the author of the 'Cybele.' These are the only English works with which that of M. Thurmann can be compared, and the resemblance is by no means close. Indeed, the careful and minute attention bestowed upon the soils and subjacent rocks on which the plants grow, is in itself a differential character of the most decided kind. The influence of soils and rocks, in relation chiefly to humidity and compactness, with that of climate in relation to altitudes, are the principal points of investigation and information.

Now, by what name ought a work of this character to be designated? It is a local flora, in so far as it is an enumeration of the plants of a small area, with the specification of their census and localities. But instead of describing the plants themselves, the physical peculiarities of place and situation, in connection with which the plants occur, are the things to be described and explained. The author endeavours to find a name sufficiently indicative of the purpose and contents of his work. He takes "Phyto-statique," rather shorter than "Phyto-statistique," although the latter might be less liable to be misapprehended,—by Englishmen, at least. But names already in use for other purposes do not serve clearly to express new things or new ideas, unless by forming combinations of them, to meet the special cases; and hence result words of inconvenient length and sound, or sentences to be employed for single names. Far better is it to invent a new name, or to take up and re-apply, in a defined sense, some old word or name of obsolete meaning. The adopted name is thus made to signify the work itself; and the work in turn becomes an illustration of the name, sufficiently precise to allow of its being again applied and understood as to the generic name for all or any works of a similar character.

The author who first applied the name of *Flora* to signify a local enumeration of plants, descriptive or otherwise, was doubtless guilty of an innovation upon the meaning of a name that had become obsolete in its original sense. But this re-applied name now furnishes a very convenient generic title, that never fails to express the nature of the work to which it belongs. If botanists would, in like manner, adopt the proposed name of *Cybele*, as a generic title for works similar in character to the 'Essai de Phytostatique,' &c., this latter mythological name would become equally convenient in use, and be found sufficiently significant of their kind and purport. '*Cybele du Jura*' would have been a shorter and more convenient title for a book, than is the paraphrase of nine words employed by M. Thurmann. Our remark here, however, is to be understood simply in a suggestive sense for the future. No doubt the title of M. Thurmann's work had been adopted, and much of the contents printed, before its author had seen a copy of the only publication which, as yet, bears the title of a *Cybele.*

The general scope and character of the work before us, probably, may be better shown by a nearly literal translation of some selected passages, than by any attempt to give a condensed view of the essay as a whole; while the elaborate copiousness of detail renders an abstract of contents quite incompatible with the ordinary limits of a book-notice. M. Thurmann appropriately dedicates his work to Mr. Charles Martins, who has accomplished so much as a scientific traveller and philosophical inquirer.

"Botanical geography," writes the author, "shows the facts of vegetable dispersion, and brings them into relation with their causes." . . . . "Botanical geography in its different parts is a science in course of formation. Phytography, climatology, geology, physics, chemistry, agriculture, fast bring to it their contingent of facts, which will one day be combined into a body of science, at present scarcely traced in outline. Meantime, it is very difficult to unite the scattered data, and bring them to bear upon one common point which is sought to be elucidated." (Preface, pp. vii. and ix.)

"Having travelled over some part of the chain of the Jura, from geological interest, each summer during upwards of fifteen years, I have been enabled, at the same time, to collect together a considerable store of data concerning its flora and the general characters of its vegetation. While visiting the neighbouring countries I was struck by the contrasts they offer with the Jura in these respects, and was naturally led to seek how far these contrasts correspond with the differences of soil which were the first object of my attention. I soon perceived that all the observed facts tended to establish the influence of the subjacent rocks on the distribution of the species. At first, I regarded this influence as arising from their chemical composition, and long saw only through the medium of this fixed idea, founded upon a number of specious appearances. Researches that I made to confirm this opinion, however, awakened doubts in my mind, and finally led me to a result directly opposed to that which I expected. I was forced to acknowledge in the state of aggregation of the subjacent rocks, the principal cause of the differences which I had attributed to their composition. Such, in few words, is the history of this work. To give a sufficiently complete view of the vegetation of the Jura taken as a ground for comparison; to show wherein it differs from that of adjacent countries; to determine the amount and the causes of these differences; among these causes, to demonstrate the slight importance of the chemical influence of the subjacent rocks and the great importance of their mechanical influence,—such is the object that I propose to myself. In other words, and to put the question more precisely, I have, in the first place, sought to show that, in the country to which my study refers, there exist evident relations between the dispersion of the species and the subjacent rocks, so that the former appears constantly as the expression of a certain condition of the latter. Afterwards, without pretending that there is no chemical influence of the subjacent rocks upon the physiological phenomena of vegetation, I have endeavoured to establish that the grand facts of distribution are not the results of such chemical influence, but those of the mechanical condition of the detritus of the same rocks." (Introduction, pp. 3, 4.)

"This work is divided into four parts. The last is essentially subsidiary, and forms a collection of data leading to the other three. It contains an enumeration of the vascular plants of the country, with their stations, their soils, their altitudes, their general area, and their Jurassic habitats more particularly. It offers a picture (*tableau*) of the flora of the Jura as complete as possible. The first part contains an investigation of the circumstances which determine the station. The conditions of climate and of soil are there treated in detail, and more especially that of the subjacent rocks: the different districts of the country are there classed under this double point of view. The second part includes a comparative examination of the vegetation and the flora in these different districts. The Jura serves for a basis and datum of comparison in this examination, which brings out the vegetable distinctions between this chain of mountains, the surrounding plains, the Vosges, the Schwarzwald, the Albe, the Kaiserstuhl, &c. The third is devoted to seeking the share of influence of the subjacent rocks in these differences, and conduces to establish the small importance of their chemical nature, and, on the other hand, the great importance of their mechanical properties. It is endeavoured afterwards to indicate some characters of the contrasted floras, and to establish a classification in this respect. Finally, are passed in review the principal facts relative to the distribution of the species remarked as yet, and it is shown that they are explicable by the theory proposed." (Introduction, page 16.)

CACTEÆ *in* HORTO DYCKENSI *cultæ Anno* 1849, *secundum Tribus et Genera digestæ, additis adnotationibus botanicis characteribusque specierum in enumeratione diagnostica Cactearum* Doct. Pfeifferi *non descriptarum, a* PPE. JOS. DE SALM-DYCK. Bonnæ, 1850. 8vo.

Joseph, Prince de Salm-Dyck, has long been known as a distinguished author on, and cultivator of, succulent plants, and his work on the *Aloes* and the genus *Mesembryanthemum*, with excellent figures, does him very great credit, and is indispensable to those who make those plants an object of study: and we heartily wish the illustrious author would favour the world with a similar publication on the *Cacteæ,* which, more than any other plants, require the aid of the pencil to render the specific distinctions intelligible. But we must not show ourselves ungrateful for the present work, which, though not so expressed in the title, is a second and very enlarged and improved edition of a 'Catalogue' published in 1844 by the same author. In order, too, that this may serve as a supplement to Dr. Pfeiffer's well-known 'Enumeratio Diagnostica Cactearum hucusque cognitarum,' Berolinis, 1837, full specific characters are given of all the species known since that period: so that the two works embrace all that is known of this extensive and remarkable family of plants. A 'Tabula Synoptica' gives seven tribes and twenty genera, as follows:—Tribe I. MELOCACTEÆ: Gen. 1. *Anhalonium*, 3 species; 2. *Pelecyphora*, 1 sp.; 3. *Mamillaria*, 157 sp.; 4. *Melocactus*, 9 sp. Tribe II. ECHINOCACTEÆ: 5. *Discocactus*, 2 sp.; 6. *Malacocarpus*, 6 sp.; 7. *Echinocactus*, 99 sp. Tribe III. CEREASTREÆ: 8. *Leuchtenbergia*, 1 sp.; 9. *Echinopsis*, 19 sp.; 10. *Pilocereus*, 7 sp.; 11. *Cereus*, 141 sp. Tribe IV. PHYLLOCACTEÆ: 12. *Phyllocactus*, 8 sp.; 13. *Epiphyllum*, 3 sp.; 14. *Disisocactus*, 1 sp. Tribe V. RHIPSALIDEÆ: 15. *Rhipsalis*, 19 sp.; 16. *Pfeiffera*, 1 sp.; 17. *Lepismium*, 2 sp. Tribe VI. OPUNTIEÆ: 18. *Nopalea*, 3 sp.; 19. *Opuntia*, 8 sp. Tribe VII. PEIRESCIEÆ: 20. *Peirescia*, 8 sp. In all, 578 species; a very large collection to be in the possession of one cultivator. In every case full characters are given of the tribes and genera.

Journal of an Excursion from SANTAREM, *on the* AMAZON *River, to* OBIDOS *and the* RIO TROMBETAS; *by* RICHARD SPRUCE, ESQ.

I wrote to you in the early part of November last, sending at the same time the leaves and flowers of *Victoria regia*, in a cask of spirits, which I hope you have received in safety. Shortly afterwards, having nearly exhausted Santarem of its flowers at that season, I applied to the Commandante Militar, Senhor Antonio Joaquim Diniz, to whom I was recommended by the President of the Province of Parà, to assist me in procuring a passage to Obidos. I had not long to wait—the Capitao dos Trabalhadores, Sr. Adriao d'Oliveira Tapajoz, was about to proceed up the river a little beyond Obidos, in a large cattle-boat, or batelao, to purchase cattle for the Santarem market; and he kindly offered us places in his cabin. I was glad to avail myself of so large a craft; but she was unfortunately made for carrying cargo rather than for sailing. Her captain was afraid of navigating in the night, when we uniformly cast anchor: by day there was either no wind, or, if any, it came from above, and the river runs in this part with a current of nearly three miles an hour, even in the dry season: the consequence was, that we were no less than nine days in performing a voyage of less than seventy English miles! No part of the river is more infested by carapanás, and after what we endured from them during those nine days we should be pretty well seasoned. Happily, the nights were dry enough to enable us to sling our hammocks in the shrouds; and I certainly much enjoyed the sleeping under the brilliant canopy of an equinoctial sky. I was able to get on shore a little nearly every day; but the southern shore is nearly all the way clad with cocoa-trees, —great harbourers, by the bye, of carapanás,—and other vegetation is extinguished, except here and there a narrow strip of weeds between the cacoals and the river. We gathered, however, some fine grasses, including two or three bamboos, and a tall grass with thick succulent stems, called, in *lingoa géral*, *Canna-rana* (*i. e.* wild sugar-cane). It contains a good deal of sugar, and my specimens, until well dried, were much infested by ants, great lovers of sweets, and consequently great pests of housewives as well as of travellers. This grass is said to be the favourite food of the peixe-boy, and it is also extensively cut for fattening cattle, which it does with great rapidity. I have seen patches of many acres in extent, on the banks both of the

Amazon and of the Trombétas. It may be the *Panicum elephantipes* of Martius.

At about half the distance between Santarem and Obidos, opposite the Ilha de Marimarituba, there is a break in the cacoals. The river here makes a wide curve to the southward, and the shore is lofty—often 200 feet high—and sometimes rocky. This we found a better field: it afforded us a fine Rubiaceous shrub, conspicuous from afar by its brilliant scarlet bracteas, a twining *Bignoniacea*, with large panicles of violet-coloured flowers, some Ferns, &c. Into this bay are two communications with the Lagoa Grande de Villa Franca, through which the waters of the latter enter the Amazon. About thirty miles above Obidos there is another channel, by which the waters of the Amazon pass into the lake; and in the rainy season there are three other small igarapés lower down, affording a similar passage to the waters of the river. A large portion of the Amazon water thus flows through the lake, and it is, therefore, incorrect to say that the channel at Obidos is the whole breadth of the Amazon, and consequently (being only two miles wide) its narrowest part. The Lagoa Grande seems to have been visited by no traveller; yet it is one of the largest lakes in South America, being from forty-five to fifty miles long from east to west, and at least twelve miles broad. The greatest breadth is nearly opposite Obidos. The village of Villa Franca is near its eastern extremity. Its waters are stated to abound in fish, and especially to contain a small species of turtle not found elsewhere. On the flat shores there are now numerous fazendas of cattle and cacao.

During our long voyage, and previously at Santarem, I had opportunities for testing the accuracy of the French Survey of this part of the Amazon, made by M. Tardy de Montravel, in the brig Boulonnaise, in the year 1844. The principal points appear correctly laid down, but, as might be expected from the short time employed in the survey, the details are very imperfect. Great obstructions seem to have been thrown in the way of the expedition by the local authorities; and when its Commander wished to ascend the river a second time, in order to correct and complete his survey, he was actually denied permission! The Amazon, opposite Santarem, as laid down in the French chart, is only one of the channels of the river, there being several others with intervening large islands, which may be considered as belonging to deltas formed by the junction with the Amazon of the large river

Tapajoz from the south, and of three small rivers from the north: the Surubiú, on which stands the village of Alemquer; and, higher up, the Cruá and the Mamurú, which divide the space between Alemquer and Obidos into three nearly equal portions. The triangular peninsula opposite Santarem, at the junction of the Tapajoz and Amazon, is constituted an island by a narrow *furo*,* called Igarapé Assú, the mouths of which are indicated but not named in the French chart. The Rio Aripixuna, debouching into the large bay of the Rio Préto,† above Santarem, becomes a furo in winter, by the waters of the Amazon entering from the north. At that season the Amazon, also, pours its waters into the same bay across the narrow isthmus at the mouth of the Lagoa Grande, and the island thus formed is called Parica-túba. North of this is the main river, flowing through at least three wide and permanent channels; the first is between the islands of Parica-túba and Marimari-túba (the latter in reality two islands, with a narrow furo between them); the second is bounded on the north by the island of Arapixi; and the third (a very wide channel) has on the north a large island without name, at the mouth of the Surubiú. There is even a fourth narrow channel of Amazon water between this island and the mainland, which must be traversed in order to reach the village of Alemquer. All these islands lie in a direct line between the Tapajoz and the Surubiú, and there are several others to eastward and westward of them.

Vessels ascending the river from Santarem generally pass to the northward of the Ilha de Marimarituba, where the current runs less swiftly; but we followed throughout the southern channel, or that laid down in the French chart. A very prominent and rather rocky point, known as the Punta de Paricatuba, is indicated but not named in this chart; it is in long. 57° 10′ west from Paris. A little higher up (in long. 57° 13′) is a small group of sitios called Goajarà, but in the chart Coapiranga. The true Coapiranga is in long. 57° 15′, nearly in the centre of the bay, and opposite the southern extremity of the island of Marimarituba.

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* *Furo*, from *furar*, to bore, a narrow channel between two islands, or through which the waters of a river pass from a higher point to a lower.

† Rio Préto, the Priest's, or Black River, is the name uniformly applied here to the lower part of the Rio Tapajoz, whose clear waters run side by side with the muddy waters of the Amazon for miles ere they mingle.

Obidos is in lat. 1° 56′ south, and long. 3h. 41m. 42·5s. west from Greenwich. A small part only of the town appears from the river, most of the houses being upon and at the back of a steep cliff of indurated and variously-coloured clays, which rises nearly perpendicularly from the shore to a height of 150 feet. The same cliff is continued for two miles up the river, and in one or two places a coarsely-grained sandstone peeps out from beneath it, apparently the same as the sandstone around Parà.

The views from the plateau of Obidos are varied and beautiful. From the western angle the eye gazes up the Amazon, which here takes a large turn to the southward, forming a wide bay at the mouth of the Trombétas, and having all the appearance of a lake. When the wind is light, and the sun declining considerably from the meridian, the river appears perfectly smooth and glassy, save for here and there an eddy formed by its swift current, and for the floating islands of grass which constantly traverse it after rain. On the left bank are the steep cliffs above-mentioned, dotted and crowned with forest. Where the cliffs cease, a small igarapé enters, coming from a beautiful lake of two arms (Lago de Jeretipâua) embosomed in dense wood. From the further bank of the igarapé rises a forest-clad sierra, stretching into the interior, until its view is obstructed by the nearer and still primitive forest of Obidos. Further up still, the river tends to south-west; and a reddish-brown patch amongst the wood marks out an Olería, or pottery, belonging to the Commandante of Obidos, and the only establishment of the kind in the Comarca. Beyond the Olería rises an abrupt round-backed sierra, the further side of which forms the shore of the Rio Trombétas. Looking nearer, we have at our feet a deep ravine pierced through the cliff, and traversed by a steep path, leading down to the praya; its sides thickly clad with shrubs, amongst which the *Rubiacea* with red bracteas, gathered in coming up the river, is most conspicuous, and including also a pretty pale-leaved *Acacia*, an Apocyneous shrub, with numerous cymes of vermilion flowers, a shrubby *Solanum*, &c. A young tree of the family of *Bombaceæ* rears its slender stem and crown of large digitate leaves amongst these shrubs. The herbage at our feet consists only of a grass with fingered spikes (a *Digitaria*) and a *Cyperus*; but there are, also, at a little distance, beds of a large *Jatropha*, with red glandular stems and leaf-stalks, palmate leaves, and heads of small deep-red flowers; the *Carrapicho*, with its prickly glutinous fruits and small white flowers; a creeping *Mimosa*, with long prickly pods; a Labiate plant, not unlike one of our *Mints*; a prickly *Cucumber*, climbing and winding over the ruined shed at my right, with others, too numerous to be even briefly enumerated. On a gently-swelling knoll to the north-west is a group of picturesque houses, some merely consisting of a tiled or thatched one-sided roof, supported on poles, and some with such superfluities as mud-walls and windows; while here and there a group of bare poles standing, indicates the position of a house now abandoned and stripped of its covering. The houses in the centre of the town are of a better class, but, upon the whole, Obidos seems to have been less prosperous, and to have been gradually falling into disrepair, ever since the disturbances of 1835. To return to our picture: the hill beyond these fragments of houses is thickly clad with virgin forest, and near its centre rises, towering above all its neighbours, the round head of a *Samaumeira* (*Eriodendron Samauma*, Mart.), now thinly clad with young leaves of delicate brown, and showing every branch of its skeleton. How remarkable that this tree, wherever it grows, rarely puts forth a branch until it has surmounted all the neighbouring trees; hence it may infallibly be known at a great distance. Truly it is the monarch of the forest! If we now look eastward, we have in the foreground the pretty church of Santa Anna, and springing out of the forest beyond, a bold wooded hill, called Serra d'Escamas. To the right we catch another view of the Amazon, stretching eastward to the utmost limits of vision. The virgin forest extends to the outskirts of the town on every side but that of the river; and we were often disturbed in our hammocks, before the morning dawn, by the howling of guaríbas quite near to us.

My letters from the President to the authorities of Obidos procured us prompt attention and assistance. There was no house at liberty; but the Commandante, Major Joao da Gama, lent us a room in a house of his own, as well as a mulatto boy to cook our food, so that we were enabled at once to commence operations. I was glad to make the acquaintance of the Vigario, Sr. Raimundo Sanches de Brito, an amiable old man, well read in Portuguese and French literature. He has had the church nearly forty years, and well recollects Martius and Spix visiting Obidos thirty years ago, but remaining only a few hours to repair their helm. Obidos, however, is a wretched place for strangers, who, if they have not good stomachs, are likely to die of hunger, the only eatables being pirarucú and farinha, except on saints' days, when an ox is killed, and the flesh sold in the market. Mr. King had been a sufferer from diarrhœa during the voyage: the disease was now aggravated by eating salt fish and drinking the muddy water of the Amazon, and assumed a dysenteric form. I also began to be similarly affected; still this did not prevent us from doing our usual amount of work, though not with equal ease and pleasure. The cliffs by the river took a good deal of looking over: here we gathered a few *Ferns*, a fine pendulous *Lycopodium*, some *Eriocauloneæ*, and numerous plants of higher Orders. The shores of the small Lago de Obidos, at the foot of the Serra d'Escamas, yielded us some marsh plants, among others a few much resembling *Lastræa Oreopteris* in habit and in the position of the sori, but scentless, and with the indusium beautifully ciliated; several trees, of the Orders *Euphorbiaceæ*, *Melastomaceæ*, &c., and some fine shrubby *Solaneæ*, *Rubiaceæ*, *Leguminosæ*, and *Laurineæ*. In the dense forest was a good deal of a *Byttneracea*, called *Cacao-rana* by the Indians, and bearing leaves and flowers rather like those of the true *Cacao*, but a tall slender tree, leafy only at the summit. We twice penetrated a long way into the primitive forest, but it was too dense and gloomy to produce many flowers.

At Obidos I met a Spanish gentleman, settled at Faro, a small town westward of Obidos, on the river Nhamundá, who informed me that *Victoria regia* grew abundantly in some lakes in that neighbourhood, and promised to send me seeds of it. I heard, too, from several persons, of the same plant inhabiting lakes on the shores of the Rio Trombétas. Before leaving England I had determined on ascending the Trombétas if practicable; but when I set out from Santarem I had no serious intention of doing this for the present, the accounts I received there being so very discouraging, and the rainy season being close at hand. I was told that beyond a short distance from the mouth there were no inhabitants; that those who went up the river at certain seasons in search of *Castanhas*, &c., were constant sufferers from a violent intermittent fever, called *seiçoens*; that no one had ever succeeded in getting far up the river; and that two Frenchmen who essayed to pass that way into Dutch Guiana, a few years ago, were never afterwards heard of. But, in conversing with Major Da Gama on the subject, I found that he had himself ascended the Trombétas as far as the mouth of the Cuminà, about twelve months before; and he assured me that I had nothing to fear, unless I should possibly fall in with a band of runaway negroes, who were supposed to have fixed themselves near the cataracts of the Trombétas.

He offered, also, to lend me a large igarité of his own, if I chose to undertake the voyage, which I at once decided to do, and requested him to procure me Indians, if possible, from the Rio Trombétas itself. I also immediately began to make the necessary preparations for the voyage, and laid in a large stock of farinha and pirarucú. I had left behind me at Santarem everything which I thought I should be least likely to want, and, amongst others, my artificial horizon, for I did not then seriously think of ascending the Trombétas. I now much regretted its absence, though, as will be hereafter seen, I sometimes found excellent artificial horizons made to my hand; and in rivers varying from three-quarters of a mile to three miles wide, I could take my altitudes to the opposite margin without much risk of error. I had some difficulty, however, in estimating the breadth of any particular part, for the Tapuyas, to whom I appealed for an opinion, have no mode of measuring distance, except by the time it requires to traverse it. Pointing to the east, they will say, starting with the sun, by the time he arrives at such a point you will reach the place of which you ask the distance, "em montaria bem puxada." But the speed of a montaria depends much on the direction of the current and the willingness of the rowers, and I am not yet *au fait* at this mode of calculating distances. It is, also, worthy of remark, that none of our Tapuyas, not even the pilot, knew more than two points of the compass, those of the sun's rising and setting. To express the direction of north and south, they say, the line that cuts the east and west in two; and they have no distinct idea of the difference between north and south, which is, perhaps, owing to their having the sun always nearly overhead at midday, or, at least, nearly an equal time to the north of the zenith as to the south. As to geography, their ideas of the position of other countries are not different from those of many Brazilians, who might be expected to be better informed. For example, they suppose that English Guiana, the United States, and England are all continuous land: Spanish America is always called "Spain," and is not understood to be distinct from the Spain of Europe. The only astronomical instruments I had with me were an excellent pocket sextant, by Sims; a compass of about an inch in diameter, with an apparatus attached, intended to serve for a dial in the latitude of

Lisbon, which I borrowed of a Portuguese baker at Obidos; and a watch, which I had purchased before leaving England, in the expectation of its being well-adapted for astronomical purposes, but which has proved to be nearly worthless. I robbed myself of many hours of sleep to make observations for determining the time; but the watch, which was losing about a minute per day when I left Obidos, increased its rate before my return to 1′ 51″ per day, and since my arrival at Santarem, I have found it to be losing above three minutes per day. I cannot, consequently, depend on the longitude of a single point, deduced from this source. The mode of our travelling precluded any accurate computation by course and distance, as we made frequent diversions from one shore to the other, when I saw ground that seemed promising, and we often halted without landing to gather flowers that overhung the river.

On the 16th of December three Tapuyas arrived from the Rio Trombétas, to man our canoe: one, an experienced man of middle age, named Raimundo, who had previously ascended the river to the cachoeiras, was to be our pilot; the other two, named Danielo and Diogo, were stalwart fellows of thirty years or more, but withal not over apt for exertion. We had an order to add two men to our crew, if necessary, at two days' journey up the river, for the canoe was large and heavy, and, though she made excellent way under sail, was not adapted for a couple of oars. I proceed now to quote from my journal:—

December 17. Monday.—Embarked at 10 A. M. for the Rio Trombétas. Reached the mouth of the river at 3½ P. M., the wind having been favourable, though with the current against us. Observations of the sun gave for latitude of entrance 1° 54½′ south, coinciding very nearly with its position on the French chart; the longitude, reduced from the latter to the meridian of Greenwich, is 3h. 42m. 2½s. west. Obidos bore from the mouth E.S.E.* The first reach of the river diverges little from the course of the Amazon at this part; it is actually nearly south-west, instead of nearly north, as given in most maps. Before reaching the real embouchure of the Trombétas, there is a narrow furo, called Maria Therésa, which makes a considerable curve, and joins the main stream at about half-an-hour's distance. The low island between the two branches is clad with vegetation, very similar to that of the shores of the Amazon, including a large proportion of *Imbaüba-*

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* These bearings are all by compass, uncorrected for variation, which is 2° 40′ east.

trees, and the same two *Willows* we had seen all the way from Gurupà. Our Tapuyas called these willows *Guayarána*. A very little within the river, a small igarapé enters from the left, coming from the Lago Bôiossú. Farther on, to the right, is another igarapé, terminating in the Lago Curumú: this igarapé enters the river at the same point as the furo leaves it. Beyond, there is a long reach of the river nearly west, and at most with only about half a point of northing. Shortly after entering it we passed an igarapé on the left, named Boca de Parú: its head is a lake, and it has several other lakes on both sides of its course. At some distance farther is the igarapé and lago Quiriquiry, where we arrived at 8½ P. M., and brought-to for the night, glad of the opportunity to sling our hammocks in a cottage belonging to our pilot's brother, and thus escape the carapanás on the river. For the last few hours we had experienced heavy rain without wind, and we found that our boat afforded us very inadequate protection from it. It had a raised tolda at the stern, in which we contrived to stow ourselves and our effects, but it was open at both ends, and, therefore, allowed the rain to beat in; while the provisions for the men were laid in the forepart of the boat, quite unprotected. It was, therefore, judged expedient to devote a day to the construction of four small moveable toldas, two for the protection of the existing tolda, and other two for securing the provisions from further damage.

December 19.—This morning left the sitio of Quiriquiry, the construction of the toldas having occupied our men the whole of the previous day. Elisardo, our pilot's brother, is a carpenter, and a very ingenious fellow; he has three or four apprentices, and seems comfortably off. He is fond of farming, too, and the banks of the lake afford him pasturage for a few young cattle. I was surprised to find him able to read and write—rare accomplishments for an Indian,—and that he had even a method of his own of writing music. His wife is a good-looking Tapuya, with very superior and almost dignified manners, but disfigured (in my eyes), like all the women here, by smoking excessively. Elisardo took us across the lake in his montaria, and we spent the day in a valley traversed by a small feeder of the lake. In the lower part we found several things, but, higher up, the forest was too thick to produce many flowers. Near the lake I was rather startled at seeing what appeared to be two snakes lying across the path—they were leaf-stalks of an Aroideous plant, possibly a *Dracontium*, called, in *lingoa géral*, *Jararáca-tajá*, *i. e. snake-plant*, and exactly resembled in their markings the venomous Jararáca. By searching in the wood we found a few young plants, but no flowers. Here, too, I was interested to fall in with the *Ajarí*, whose leaves are much used for killing fish: it is a pretty half-shrubby plant, with purple papilionaceous flowers, and leaves almost as silvery as those of *Alchemilla alpina.* I have heard it called, also, *Cunambi*, but this seems a general name for plants of which the same use is made. According to Martius, a Euphorbiaceous plant, the *Phyllanthus Conami* of Swartz, possessing similar properties, is called *Cunabi* in *lingoa géral.*

It was here that our men were employed in constructing the toldas, there being close at hand great plenty of the *Pindoba* palm (the stemless variety of *Attalea compta*, Mart.), the fronds of which suited their purpose. In the vicinity of Santarem and Obidos, the fronds of the *Pindoba* are universally used for thatching, as those of the *Bussú* and *Ubim* are around Parà. When growing, the *pinnæ* spread out horizontally on each side of the midrib; but, for thatching, those of one side are bent over between the interstices of those on the other, and thus a sort of long tile is made, the midrib of the frond forming its upper edge. A roof constructed of several layers of these is impenetrable by any rain. In preparing our toldas, the *pinnæ* were not bent to one side, but the fronds being laid together, so that each was half covered by the adjacent one, the *pinnæ*, crossing at right angles, were then interwoven into a sort of mat. Three fronds in breadth, and two or three in thickness, formed a perfectly waterproof tolda.

Shortly after starting this morning, we passed on the right an igarapé coming from the Lago Itapecurú. It is well to remark here that these igarapés all bear the same name as the lake from which they flow, and, as will hereafter be seen, the Trombétas is truly a river of lakes. Beyond the igarapé Itapecurú, the river gradually veers round to W.N.W.; it then turns further, and assumes a N.W. direction, until the rounding of a point brings us to the mouth of the Rio Iripixy. Shortly, however, before arriving here, we pass the Furo Caxoiry, on the left, which leaves the Amazon nearly opposite the upper entrance to the Lagoa Grande. I learnt that the Rio Iripixy had not a very long course, and that it also took its rise in a lake. Directly opposite its mouth is the Lago Irurià, the entrance to which is by two short channels, separated by a small island of gently-swelling land, with green grassy margins.

December 20.—Remained last night at the Sitio d'Iripixy, belonging to Senhor Manoel Bentes, a young man related to Major Da Gama. Here we had an order to add two men to our crew: by 10 o'clock we succeeded in getting one, a Mulatto, named Manoel, who proved a much more useful hand than the Tapuyas. Above Iripixy the course of the river is north-west by north. An hour's pulling brought us to the mouth of the Furo Sapucuâ, a wide channel which affords a passage for the waters of both the Amazon and the Nhamundà (or Jamundas). *Above this no more Amazon water—no more carapanás.* The unmixed waters of the Trombétas are perfectly pure and of a black colour—a sure index of the absence of all "praga," as carapanás, mutucas, and the whole tribe of bloodsuckers, are here significantly called.

At the entrance of the Rio Sapucua there are two or three small islands, and at some distance up appears a long range of hills, called Serra de Sapucuá, or Cunuri. I was not aware, until my return to Santarem, that a short way within this river resides a very excellent boat and ship-builder, named Damiao, who has fixed himself there for the sake of being near suitable timber. He has turned out some very superior vessels, especially a schooner called the Leoa, belonging to my countryman Mr. E. Jeffreys, of Santarem, reputed the swiftest sailer on the Amazon, and another which now trades between Lisbon and Parà. These are both built of Itaüba. I much regret not having known this at the time, as I should certainly have turned out of my way to inspect the establishment. On the Sapucuâ are, also, numerous cattle-farms, and some thousand head are said to be annually reared here, and disposed of to merchants of Santarem and others. It was to this river that Senhor Tapajoz's batelao was bound.

Up to this point the average width of the Trombétas had seemed to be about three-quarters of a mile, but here it expanded to a mile and a half. A little higher is an island, perhaps three miles long, called Jacitára, in the middle of the river. Upon it we remarked numerous *Jauarí* palms (*Astrocaryum Jauarí*, Mart.), which are unknown in the vicinity of Parà. Above it are other two islands without names. Here the river opens out to from two to three miles wide, and preserves this width beyond the islands. We took the channel to the right of the islands. The shore of the main land is hollowed out into deep bays, with a beautiful sandy beach, clad with old low trees, some of them containing *Orchideæ.* The twisted and stunted shrubs growing near the water's edge, and in the rainy season laid under water, were beset with sponge-like incrustations, which seem to me to be the work of some zoophyte. I send specimens. Towards evening we approached another group of islands. A narrow channel between the two northernmost is called the Furo de Chiriry, and nearly opposite to it is a long peninsula, called Punta de Caipurû, the latter entering from north-east by east. Turning the point a little before sunset, we drew up in front of a large sitio, called Santa Cruz, the residence of Senhor Angelo Bentes, where I was desirous of adding to our stock of farinha.

December 21.—We passed the night at Santa Cruz. Our host, a man of middle age, has been helpless and confined to his hammock from paralysis for twelve years, yet manages the affairs of this and other sitios he possesses on the river, and takes long journeys by water, always travelling in his hammock. I found him a man of much information, very communicative and (what I had of late rarely met with) curious about the affairs of Europe. He is unmarried, but a maiden sister — a matronly old lady, and apparently an excellent manager—keeps his house. Both at this time and on our return, I was pleased to remark, that she assembled the slaves every evening to prayers. We ourselves experienced much kindness: a fowl was cooked for our supper, and another in the morning to be carried with us when we resumed our voyage. The house is large, lofty, neat, and commodious, though built only of upright poles and mud plaster, and thatched with *Pindoba.* The doors are of *Cedro*, the door-posts of *Itaüba*, and the linings of the recesses of *Louro.* The cedar-wood (as it is called) is excellent for the inside-work of houses, being not liable to the attacks of insects, but it will not bear exposure to the weather. It grows to an immense size on the Solimoêns and the Rio Negro; but such is the cost in this country of cutting it up and transporting it, that Brother Jonathan can sell his pinewoods at Parà for less than the cedar can be afforded at. Senhor Angelo informed me that the Pao de Cedro grew in the forest at no great distance from his house, and he insisted on my staying two or three days with him on my way down the river, when he promised to send a man with me to show me this and several other trees.

The Rio Caipurú is broad and clear, with beautiful sandy sloping shores, and sitios peeping out here and there among the forest on both sides. It is said not to be very long, but to be divided into numerous igarapés, flowing through thick forest. The view, in the early morning, from Senhor Angelo's house, standing on high ground on the northern bank, was very fine. The mist curling up from the water, as it rippled on the white beach, showed a few canoes and montarias lying at anchor, then, rising higher, revealed the forest of the opposite bank, clothing a succession of low serras, one behind the other; while the right and left of the picture were formed by noble trees, interspersed with *Jauarí-palms*. Near the house are plantations of *Mandiocca*, *Sugar-cane*, *Batatas*, *Arrowroot*, &c.; and the climate is so moist, that, according to Senhor Angelo, sowing and planting may be performed at all seasons of the year. A great pest, however, of sandy countries throughout the province, is the large Saüba ant, which builds pyramids far more wonderful than those of Egypt, if the size of the masons be considered: is a greater roadmaker than ever the Romans were, its highways being kept much cleaner and neater than the paths of the country, and excavates mines and galleries underground, far more complicated than the most extensive of our English coal-mines. Its food, and great part of the materials for its various works, are derived from the green leaves of trees; and I was shown some orange-trees at Senhor Angelo's which the Saüba ants had stripped of their foliage in a single night. The cultivation of arrowroot in this district dates only from a few years ago. The plant, which seems a species of *Maranta*, though I have not yet seen its flower, occurs in various parts of the Rio Trombétas; and the Indians have long been in the habit of transporting the roots to their roças, calling them *Jacaré-rana*, in allusion to their obvious resemblance to an alligator, and connecting them with some superstitious observances, but quite ignorant of their use as an article of diet. A person from Pernambuco, on a visit to the Rio Trombétas, recognized the plant to be the Arrowroot of commerce, and Senhor Angelo was the first to avail himself of the information thus obtained. He now cultivates the plant extensively, and prepares the farinha in the same way as that of mandiocca. He finds it a diet suitable above all others to his necessarily sedentary life, and eats it daily. We breakfasted upon it, and, unless I am mistaken, I never tasted such excellent arrowroot in England. I have lately learnt that the Arrowroot plant grows high up the Rio Tapajoz in great plenty.

Leaving the Rio Caipurú we re-entered the Trombétas, and passed through the Furo de Chiriry, with the object of coasting along the left bank of the river. The shores of the furo were lined on both sides with a beautiful grass, apparently some species of *Luziola*, growing deep into the water. The flowers were monœcious, the male panicle uppermost, with very fugacious solitary flowers, each containing six yellow stamens, enclosed in glumes of the most delicate pink colour, with purple streaks. In the axil of a lower leaf was the female panicle, much contracted, with slender bristly branches, the lower ones deflexed when in fruit. From the base of the dilated leaf-sheaths proceeded pencils of capillary radicles, floating in the water or rooting in the mud. Emerging from the furo, we entered a long reach of the river, bearing north-west by north half west, apparently about a mile and a half wide; but this, it must be recollected, is not the whole breadth of the river, the land on our right being an island. No sandy beach here; skirting the forest is a strip of low entangled shrubs, consisting chiefly of a *Myrtacea*, called *Açara*, with red edible fruit the size of sloes, and another shrub called *Juranduba*, also with red fruit, but so acid as to be uneatable. Five hours' sailing in this reach with a light breeze—our rate probably two miles an hour—brought us to a narrow igarapé, entering on the left from the Lago de Samaüma. At 6½ P. M. (we had started not much before 10 in the morning) the river turned to about N.N.W., still preserving the same width and with nearly parallel straight banks. In an hour more the shore gradually rounded to north-west by west. On the right bank enters a slender still igarapé, from a lake called Auapetúa. After passing this, we crossed to the left bank, and gained the point at the junction of the Rio Cuminá with the Trombétas, which was to be our halting-place for the night.

December 22.—I was surprised to find the spot our pilot had selected for our night's lodging already occupied by a detachment of five soldiers from Obidos, designed for the protection of the turtle-beds in the Trombétas and Aripecurú, and denominated an *Estacamento*, from the deposits of turtles' eggs being marked out by stakes (*estacas*). I learnt from the officer in command that the Estacamento commenced on the 10th of September, and would cease at the end of the year, by which time all the young turtles would have taken to the water. I found him familiar with the Trombétas and its principal tributaries. He had ascended the main river some months before as far as the cachoeiras, at the head of a party who were in quest of runaway negroes. They left their canoes on reaching the first cataract, where he estimated the fall of the water to be about fifteen feet, and prosecuted their journey by land for some days, during which time they passed seven cachoeiras, some being distinct falls, and others merely rapids among rocks. At the rate we were travelling, he estimated the distance to the first cachoeira of the Trombétas at eight days, and to that of the Aripecurú at four days. I should have mentioned previously, that in consequence of information received from Senhor Angelo Bentes, I had decided on changing my original intention of proceeding to the cachoeiras of the main river, and on visiting those of the Rio Aripecurú instead. From him I learnt that the falls of the latter river were more abrupt, and much more numerous, and that the adjacent serras were far more lofty. All this was confirmed by the commander of the Estacamento. Another reason for this change in my destination was, that the falls of the Aripecurú could be reached in half the time, a consideration of the first importance, as we had unmistakeable intimations that the rainy season was commencing. Last night was dry enough to allow us to sling our hammocks under the trees, but so gloomy that I was unable to get any observation for determining the position of the junction of the Cuminâ and Trombétas, which I much desired to do.

This morning we found ourselves in a wide bay, formed by the junction of the Trombétas, Cuminá, and Aripecurú, and appearing quite shut in on the north side by a long line of coast stretching east and west. The Trombétas enters this bay from west by north; but, so far as I have been able to ascertain, its general course is from the north-west. The Cumina enters from east-north-east, and just within its mouth enters the Aripecurú from north north-east, by two mouths, with a long narrow island between them. In less than an hour we are fairly within the Aripecurú. The land on our right swells into serras densely covered with mato. Here and there are deep bays, with valleys running up from them, each, probably, affording a passage to an igarapé, but so overhung with trees as not to be discernible from the opposite bank, along which we are coasting. Jauarí palms are abundant, especially on the island, while the slender lofty trunk and white bark of the *Taxizeira* are everywhere visible. A little way in is another island, between the first island and the right bank. The channel between the islands is, towards its further extremity, nearly choked with the pretty grass above-mentioned. Our men pushed through with poles. After threading about among islands in narrow channels, walled in by lofty trees and tapestried by an impenetrable mass of twiners, among which a *Bignoniacea*, with large panicles of purple foxglove-like flowers, is most conspicuous, we emerge into the main stream about 12 o'clock, joining the other arm before spoken of. Their united course is first north-west by west; breadth from 500 to 800 yards. A little way up, the course trends rather more northerly, and a very long island separates the river into two channels. That to the right, which we are now entering, is very shallow, with here and there sandbanks peeping out—resorts of tartaruga. At a short distance within it an igarapé enters from a lake without name. The channel grows more and more obstructed with sandbanks, until it is at length nearly choked, leaving only a narrow strip of water on the western side, along which our canoe could pass. Towards night we drew up about midway of the bank on our left, the first great tartaruga-bed on the river, and appearing about 200 yards broad. Our men immediately dispersed in search of turtles' eggs, now become very scarce. They found a few of two species of turtle, the larger of which they called tartaruga, and the smaller tracajá.

This day, a little after entering the Aripecurú, we passed two small Indian sitios, the last human habitations we were to meet with. On the Rio Trombétas there are said to be only three sitios above its junction with the Aripecurú.

(*To be continued.*)

Report on the Dried Plants collected by Mr. Spruce *in the neighbourhood of* Pará *in the months of July, August, and September,* 1849 ; *by* George Bentham, Esq.

This collection, received in January 1850, and distributed to the subscribers in February, consisted of about 270 species of Phænogamous plants, and 76 Ferns. A large proportion, however, were only sent in single specimens, or in very small numbers, and many of the subscribers' sets contain less than a hundred species. When Mr. Spruce left England he had as yet but very few names on his subscription list; and he was still further deterred from collecting very largely at first, by the fear, that whilst tropical vegetation was still new to him, he might displease his supporters by remitting too many common coast plants. He has, however, retained a complete series of all he has sent, so as to be enabled on future occasions to complete the sets of all such as have proved on examination to be of sufficient interest. For this purpose a named list has been returned to him, with the exact number of specimens distributed of each species; and as he is now aware that the list of his subscribers is considerably lengthened, and as he is, moreover, in a far more interesting country, it is to be expected that his next remittances will admit of a much more extended distribution. His specimens are in general as instructive and as well-preserved as the best collections received from the moist tropical districts of America.

The extracts from Mr. Spruce's letters, inserted at p. 65 of this volume, give the particulars of the localities visited in making the collection, and the specimens having been distributed with names, a general list would here be superfluous. The following notes relate only to such of them as appeared to call for special remark, with characters of the most marked among the new species. In their arrangement, the order so generally adopted as most convenient, that of De Candolle, with some slight modifications, is here followed, and cannot be too strongly recommended to all collectors and enumerators of collections, until some other be proposed so decidedly better, as that its advantages may counterbalance the inconvenience of departing from one in such general use.

Of *Anonaceæ*, so rarely wanting in collections from eastern tropical America, there are no specimens. Among *Myristiceæ*, now more generally associated with *Anonaceæ* than with *Laurineæ*, there are two forms or species of the *Ucù-uba*, or Oil-tree, mentioned in the Kew list, n. 15 (p. 72 of this vol.). The one specially designated by Mr. Spruce as furnishing the oil, is the narrow-leaved *Myristica fatua*, Sw.: the specimens are in flower, and were gathered from a tree about one hundred feet in height. Of the broader-leaved *M. sebifera*, Sw., figured by Aublet as his *Virola sebifera*, there were only two or three specimens in fruit, from a small tree in the immediate neighbourhood of Parà. Notwithstanding the difference usually observed in the venation as well as in the breadth of the leaves, it is yet doubtful whether the two are not mere varieties of one species.

The *Polygaleæ* comprise specimens, not in sufficient number for general distribution, of the handsome *Polygala spectabilis*, DC., and of two *Securidacæ*, one of them hitherto undescribed, allied in foliage to *S. ovalifolia*, St. Hil., but without any hairs on the leaves, and with differently formed and proportioned petals. It may be thus characterized: Securidaca *retusa*, scandens, glabra v. summitatibus vix puberulis, foliis tenuibus ovatis obtusissimis retusisve, alis orbiculatis, carina lata apice vix triloba plicato-cristata, petalis superioribus orbiculatis.—Frutex super arbores scandens. Folia 1–1½ poll. longa, breviter petiolata, apice basique obtusissima v. emarginata, tenuiter venosa. Racemi terminales, laxæ, 2–4-pollicares, rhachi pedicellisque puberulis. Calycis foliola 3, puberula, vix linea lôngiora; alæ breviter unguiculatæ, 4 lin. longæ et latæ, glabræ, haud ciliatæ. Carina breviter unguiculata, supra unguem 3 lin. longa et lata, apice minute triloba, lobo medio cristato. Petala superiora 2 lin. longa, inæquilatera, se invicem applicita. Fructus non visus.*

The specimens distributed under the name of *Casearia grandiflora*, St. Hil., differ from the more southern Brazilian ones in their leaves, copiously marked with pellucid dots; but the number of these vary in several *Caseariæ*, and I can find no other distinction.

The few *Malvaceæ* are uninteresting. The fine specimens of *Pachira aquatica* differ slightly from the Guiana form in their broader leaves, but do not appear to be specifically distinct.

The *Anani*, n. 14 of the Kew list (p. 72), is the *Moronobea globulifera*, Schlecht., generally distributed. The remaining *Gutifferæ* were in very few specimens only: among these, two parasitic *Clusiæ*, one apparently the *C. Hoffmanseggia*, Schlecht., the others probably new. There is but one specimen of a *Caraipa*, also new, but not the *Caraipé*, or *Pottery-tree*, which will be mentioned under *Chrysobalanaceæ*. The name of *Caraipé* (the meaning of which is unknown to me) is evidently given by the Brazilians to several very different trees. *Ruyschia corallina* and *Platonia insignis* have been sent to most subscribers. Of *Marcgravia umbellata* there were but very few, with its singular slender barren branches running close against the bark of trees, to the length of many feet, with leaves totally unlike those of the flowering-stems.

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* I take this opportunity of correcting a mistake of Walpers, who, in his Repertorium (vol. i. p. 246, 247), has enumerated as *Securidacæ* the five species of *Seguiera* which I had published in the 'Linnean Transactions.'

The *Muruxi*, n. 20 of the Kew list (p. 74), is the *Byrsonima spicata*, Rich., and the *Umiri*, n. 13 (p. 72), is the *Humirium floribundum*, Mart.

The two following *Sapindaceæ* are new; neither, however, were sent in sufficent numbers for general distribution.

Cupania *longifolia*, foliolis 15–18 alternis anguste oblongis basi inæqualiter angustatis integerrimis glaberrimis nitidis, panicula ampla floribunda, petalis oblongis calyce duplo longioribus squamam hirsutissimam superantibus, staminibus 4–6.—Foliorum petiolus communis bipedalis, triqueter, glaber, acumine obtuso terminatus. Foliola irregulariter alterna, 6–9 poll. longa, 1½–2 poll. lata, obtusa, fere coriacea, penninervia et reticulato-venosa, petiolulo brevi crasso. Panicula tomento minutissimo subcanescens, ramis sulcato-angulatis, primariis 1–1½-pedalibus. Flores secus ramos ultimos fasciculati, sessiles v. breviter pedicellati, vix 1½ lin. longi. Calycis laciniæ lato-ovatæ, obtusæ, extus pubescentes. Petala 5, inter se æqualia, angusta, extus leviter puberula. Squama bifida, longe pilosa, petali dimidium æquans v. paulo superans. Discus in lobos 5 crassos truncatos cum petalis alternantes divisus. Stamina intra discum inserta, sæpius 5 cum ejus lobis alternantia, unum tamen interdum ad squamam minutam reductum, et semel enumeravi sex. Filamenta hispida. Antheræ lineares, mucronulata, petala subæquantes. Ovarium nonnisi abortivum vidi, stylo brevi hispido.

This is, according to Mr. Spruce, a tree 150 feet high, from the neighbourhood of Parà. I have only seen two of the large leaves, with a portion of the panicle, in which I have not succeeded in detecting any other flowers than males by abortion of the ovary, but they are quite sufficient to establish it as a very distinct species.

Talisia *laxiflora*, foliolis 10–20 oblique oblongis obtuse acuminatis basi rotundatis glabriusculis subtus pallidis, panicula laxa, calycibus petalis brevioribus.—Ramuli sulcati, verruculosi, glabri. Foliorum petiolus communis 8–10-pollicaris, minute tomentellus, teres v. infra foliola superiora marginatus, seta brevi terminatus. Foliola alterna, petiolulata, 2–4-pollicaria, basi hinc rotundata illinc acuta, rarius æquilatera, supra siccitate nigricantia, utrinque oculo nudo glabra, sub lente tamen pili minuti rari apparent. Panicula ei *Cupaniæ micranthæ* subsimilis, laxior tamen et oblonga. Cymæ secus ramulos pedunculatæ, multifloræ. Flores parvi, brevissime pedicellati. Calyx extus parce puberulus, siccitate nigricans, lobis brevibus latis. Petala lacinias calycinas duplo excedentia, semilineam longa, late orbicularia, apice retusa, extus glabra, squamis bipartitis dense hirsutis petala ipsa superantibus. Discus crasse carnosus. Stamina 8. Ovarium 3-loculare, apice crasso-carnosum, integrum, obtusissimum, summo vertice tenuiter stigmatosum absque stylo distincto.

Gathered at Tanaü, on the Rio Acarà. Mr. Spruce states it to be a tree with spreading branches.

In Cambessèdes' memoir on *Sapindaceæ*, *Talisia*, of which the fruit is unknown, is distinguished from *Cupania* by the length of the scales inside the petals, and by the absence of any distinct style. If the former characters alone were relied on, *Cupania punctata*, Camb., *C. micrantha*, Mart., and some others, should be referred to *Talisia*; they have, however, been retained in *Cupania*, on account of their style. The limits of the latter extensive genus are at present but little understood; but if Aublet's *Talisia* be adopted as distinct, there is no doubt that our species should be associated with it.

A *Cochlospermum* from Caripi, distributed to several of the subscribers, appears to be new, but I have at present no means of comparing it with *C. Parkeri*, Planch., with which it evidently has much affinity, and may be identical.

Among the remaining *Thalamifloræ* there are a few specimens of the *Souari* (*Caryocar glabrum*, Pers.), the *Carambole* (*Averrhoa Carambola*, L.), the *Cashew-nut* (*Anacardium occidentale*, L.), and the *Mango* (*Mangifera Indica*, L.), and several of a new *Tapiria*, of which I defer the description for a general review of the genus, as our herbaria contain several unpublished species from Guiana and tropical Brazil.

(*To be continued.*)

Extracts from the private Letters of Dr. J. D. HOOKER, *written during a Botanical Mission to* INDIA.

DARJEELING TO THE BORDERS OF BHOTAN.

(*Continued from p.* 173.)

Descending from Ging, the road passes the village of Badamtam, similar to Ging in its houses and agriculture, though the houses are *better*, and therefore far less picturesque. Hereabouts the *Gordonia* commences, with *Cedrela Toona*, and various tropical genera, such as abound near Punkabarrie. The rocks are still gneiss, but of much harder texture, and containing more numerous and broader seams of quartz than at a greater elevation: they are often slaty, much contorted, with various dips. The heat and hardness of the rocks cause the streams to dry up on these abrupt hills, especially on this, the eastern slope. The water is hence conveyed along the sides of the path, in conduits, ingeniously made of bamboo, either split in half, with the septa removed, or, what is better, whole, except at the septum, which is removed through a lateral hole. The steepness and closeness of this valley (of the Rungmo river) rendered the heat intense. The *Oak* of this level (3,000 feet) and *Chestnut*, are both different from those which grow above, as are the *Brambles*. The *Arums* are replaced by *Caladiums*. *Tree-ferns* cease below 4,000 feet, and the large *Bamboo* abounds. The *Banana*, too, is a different species, larger, though still it is one of the small kinds. Its fruit is quite uneatable, but the natives assure me it may be improved by transplanting.

At about 2,000 feet, and ten or eleven miles distant from Darjeeling, we arrived at a low long spur, dipping down to the bed of the Rungeet, at its junction with the Rungmo. This is the boundary of the British ground, and there is a guard-house and a Sepoy or two at it. Here we halted, and pitched a small hill-tent, kindly lent me by Major Crommelin,* of Darjeeling, and which, as being carried on one man's back, was admirably suited for such excursions. It took the Lepchas about twenty minutes to construct a table and two bedsteads under the tent: each was made of four forked sticks, stuck in the ground, supporting as many side-pieces, across which flat split pieces of bamboo were laid, and all bound tight together, by strips of *Calamus* stem. The beds were afterwards softened by many layers of bamboo leaf; and if not very downy, they were dry, and as firm as if put together with screws and joints.

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* I have received a great deal of kindness from Major C., both in the loan of this tent, of books, and in the collecting of plants. He has, also, given me several nice things for the Museum, and lent me a charming coloured sketch of the Snowy Range, drawn by himself.

This spur rises out of the bottom of a deep valley, quite surrounded by lofty mountains: it is narrow and steep on both sides, formed of very hard slate-rocks, with abundance of quartz. North, it looks down into a gulley, at the bottom of which the Rungeet's foamy stream winds amongst a deep forest. In the opposite direction, the Rungmo comes tearing down from the top of Sinchul, 7,000 feet above; and though its roar is heard aloud, and its course is visible throughout its length, the stream itself is nowhere seen, so deep does it cut its channel. Except on this, and a few similarly hard rocky hills around, the vegetation is a mass of jungle and wood. At this spot it is rather scanty and dry, with abundance of the *Pinus longifolia* and *Sal, Phyllanthus Emblica*, *Grislea*, *Lagœrstromia*, and such plants as I had met with on the dry hills of the Soane. A small *Phœnix*, too, was very abundant: the stem is spherical, and about as large as a good turnep: with the leaves the natives disguise themselves when hunting, but do not plant or otherwise use it.

Following a narrow path up the river for a mile or two, we found the hill-side extremely steep, hard, and dry, with more *Bamboo* than was good for botany: its being in process of burning rendered walking very disagreeable. The descent to the river was exceedingly steep, the banks presenting an impenetrable jungle of *Lygodium* (my old enemy in New Zealand travelling), prickly *Panax*, *Vitis*, *Cissus*, and *Leea*, numerous *Ferns*, &c. The *Pines* on the arid crests of the hills around, formed a remarkable feature: they grow like the *Scotch Fir*, the tall red trunks and a bushy top springing out of the steepest and driest slopes of broken quartz rock. But little resin exudes from the trunk, which, like that of most *Pines*, is singularly free from *Lichens* and *Mosses*. The wood of the young branches is so imbued with turpentine, that, when peeled, it looks semitransparent, exactly like greased bone, and the slender boughs make beautiful torches; but the Lepchas derive no further service from the tree. Being confined to dry soil, this *Pine* is rather local, and the elevation it attains here is not above 3,000 or 2,500 feet. In Bhotan, where there is more barren country, it ranges about the same, and in the north-western provinces from 2,500 to 7,000 feet.

The Lepcha never inhabits one spot for more than three successive years; after which, an increased rent is demanded by the Rajah. He therefore *squats* (as the Americans say) in any place which he can render profitable for that period, and then shifts to another. The first operation, after selecting his site, is to burn the jungle; then he clears away the trees and cultivates between the stumps. At this season, firing the jungle is a frequent practice, and the effect by night is exceedingly fine. A forest, so dry and full of bamboo, and spreading over such steep hills, affords grand blazing spectacles. Heavy clouds canopy the mountains above, and, stretching across the valleys, shut out the firmament; the air is a dead calm, as usual in such deep valleys, and the fires, invisible by day, are now seen raging all around, and (to an inexperienced eye) appear in all but dangerous proximity. The voice of insects and birds being hushed, nothing is audible but the harsh roar of the Rungeet and Rungmo, and occasionally, far above it, rises that of the forest-fires. We are literally surrounded with them: some smoulder like the shale-heaps at a colliery, others bicker and burst forth fitfully, whilst still others stalk along with a steadily increasing and enlarging lambent flame, shooting up great tongues of fire, which spare nothing as they advance in their might. Their triumph is in reaching a great bamboo clump, when the yell of the flames drowns that of the torrents, and as the great stem-joints burst, from the expansion of the confined air, the noise is that of a salvo from a park of artillery. I have seen houses and ships on fire, but such a jubilee of flame as the burning of the Himalayan forest I never beheld. From Darjeeling, 5,000 feet above this, you may see the blaze and hear the deadened report of the bamboos bursting, all night long; but in the valley, and within a mile of the scene of destruction, the effect is most grand, being heightened by the glare reflected from the masses of mist which hover above.

But so it is with everything Himalayan:—all is Titanian; most conspicuous in the elements and natural phenomena; no less marked in its 15,000 feet of perpendicular height clothed with vegetation, than in its zoology, from the lammergeyer of its snows, to the elephant, rhinoceros, and python of its skirting forests. The volcano and ocean alone are absent; these I beheld in their stern glory during the Antarctic Voyage; otherwise the Himalaya presents an epitome of all that is grand and varied in nature.

On the following morning we pursued a path to the bed of the river. At an angle of the road is a rude Buddhist monument, a pile of slate rocks, with an attempt at the mysterious hemisphere at top. A few flags or banners and slabs of slate are inscribed with "Om Mani Padmi hom." Placed on a jutting angle of the spur, backed with the pine-clad hills and flanked by the torrent on either hand, the spot was wild and picturesque; and I could not but gaze, with a feeling of deep interest, on these feeble traces of a religion which numbers more votaries than perhaps any two combined on the face of the globe. Buddhism in some form is, you know, the predominating creed, from Siberia to the plains of India, from the Caspian steppes to Japan, throughout China, Burmah, Ava, a great part of the Malayan Archipelago, and Ceylon. Its associations enter into every book of travels over these vast regions, with Buddha, Dhurma, Sunga, Jos, Fo, and praying-wheels. The mind is arrested by the names, the imagination captivated by its dark symbols; and though I could not worship in the grove, it was impossible to deny to the inscribed "Om Mani Padmi hom" such a tribute as the first glimpse commands of objects which have long been familiar to our minds, but not previously offered to our senses. My head-Lepcha went further:—to a due observance of demon-worship he unites a deep reverence for the Lamas, and he venerates their symbols, rather as *theirs*, than those of their God. He walked round the pile of stones three times from left to right, repeating his "Om Mani," &c., then stood before it with his head hung down and long queue streaming behind, and concluded by the votive offering of three pine-cones. When done, he looked round at me, nodded, smirked, and elevated the angles of his little turned-up eyes, and seemed to think we were safe from all the perils of the valleys yet to be explored.

In the gorge of the Rungeet, the heat was intolerable, though the thermometer did not rise above 95°. The mountains leave but a narrow channel between them, here and there bordered by a belt of strong soil, supporting a towering crop of *Saccharum*, *Caladiums*, and *Wrightia mollissima*, *Terminalia*, *Pentapteris*, and *Shorea*. The troubled river, about eighty yards across, rages along over a gravelly bed, margined with slate-rocks, on which grow a curious dwarf *Ficus* and *Croton*, both like bushes of *Myrica Gale.* Crossing the Rungmo, where it falls into the Rungeet, we came upon a groupe of Bhoteas, drinking fermented Murwa liquor, under a rock: I had a good deal of difficulty in getting my people past, and more in inducing one of the topers to take the place of a Ghorka (Nipalese) of our party who was ill with fever. Soon after we had to cross the river, at a spot most wild and beautiful, and where my eyes were gladdened with a sight of one of the most characteristic of Himalayan objects of art, a *cane bridge*! All the spurs round the bases of which the river flowed, were steep and rocky, their flanks clothed with the richest tropical forest, their crests tipped with towering hungry-looking *Pines.* On the river's edge, the *Banana, Pandanus*? and *Bauhinia racemosa,* or *scandens,* were most frequent, with *Figs* and the trees above-mentioned. One exceedingly beautiful *Ficus,* of a species new to me, projected over the stream, growing out of a mass of rock, its roots interlaced and grappling at every available support in its neighbourhood, while its branches, loaded with deep glossy foliage, hung over the stream. This tree formed one pier for the canes; that on the opposite bank was constructed of strong piles, propped all round. Between them the frail structure swung, about eighty yards long, ever rocking over the torrent (forty feet below); though I could not detect any further cause for the motion than the draught of air possibly induced by the rapid flow of the current beneath (as a circular disc, revolved over a stationary one, communicates to the latter a similar motion). The fragility and extreme simplicity of the structure were very remarkable. Two parallel canes, on the same horizontal plane, were stretched across the stream; from them others hung in loops, and along the loops were laid one or two bamboo stems for flooring; cross-pieces, below this flooring, keep the two upper canes apart. You ascend the rock by the interlaced roots of the *Ficus,* grasp one of the canes in either hand, and walk along the loose bamboos laid on the swinging loops: the motion is frightful, and the rattling of the loose dry bamboos is neither a musical sound (the whole structure seems as if it were going to break down), nor is it calculated to inspire confidence. As you may not understand this without a sketch, I adjoin one. With shoes on the feet it is almost impossible to walk on the round dry bamboo, which affords the only footing; nor is it easy with bare feet, especially as there is often but one bamboo, which, when the fastening is loose, tilts up with your weight, and leaves you clinging to the slender canes. When properly and strongly made, with good fastenings and a floor of bamboos laid *transversely,* these bridges are of course as easy to cross as any wooden one. A species of *Calamus* affords the canes: they are as thick as the finger, and twenty or thirty yards long, knotted together, and the other pieces are fastened to them by strips of the same. A Lepcha, carrying 140 lbs. on his back, crosses without hesitation, slowly but steadily, and with perfect confidence—assurance you may call it, or perhaps fool-hardiness. A deep broad pool below the bridge was made available for a ferry: the boat is a triangular raft of bamboo-stems, with a stage on the top, and it was secured on the opposite side of the stream, having a cane reaching across to this. A stout Lepcha jumped into the boiling flood, and boldly swam across, holding on by the cane, without which he would have been carried away. Unfastening the raft, we drew it over (by the cane), and, seated on the stage, with our feet and legs up to the knees in water, we were pulled across, the raft bobbing up and down over the rippling stream.

(To be continued.)

BOTANICAL INFORMATION.

Victoria Regia.

This royal aquatic may now be considered established, as a stove-plant, in the gardens of Great Britain; that is, among those horticulturists who will incur the expense of a tank large enough for its cultivation. Besides the noble residences of Chatsworth and Syon, the plant is now, thanks to the recent introduction of good water by the Commissioners of Her Majesty's Woods and Forests, flowering at the Royal Gardens of Kew; and at the two former places, it is well known, fruit and perfect seeds are abundantly produced. Already these seeds have been sent to, and reared in, the lakes of Trinidad and Jamaica, and our most recent letters from Dr. Falconer, of the H. E. I. C. Botanic Garden (dated 2nd May), announce the arrival of the new head-gardener, Mr. Scott, at that establishment, bringing with him seeds of *Victoria regia*, which, says our valued correspondent, "will constitute a splendid feature in our out-of-door tanks, surrounded with *Nelumbium speciosum*, which we grow almost by the acre, *Euryale ferox*, and *Nymphæa rubra*, &c.; but we have yet to ascertain whether the seed will germinate."

From the magnificent plant of *Victoria* at Syon, the well-known botanical artist, Mr. Fitch, has been allowed by the noble owner to execute a series of coloured drawings in all stages of the flowering and fruiting, with analyses, showing its curious structure. A selection has been made from them, which is now in preparation for a work in thin folio, to consist of four plates, consisting of—1. A reduced figure of the entire plant. 2. A view of the flower in the act of expanding, together with as much of the foliage, &c. (in situ) as the paper will admit, *nat. size.* 3. A fully-developed flower, and do. do. 4. A vertical section of a fully-developed flower, *nat. size*, together with various dissections and analyses, of the natural size, or magnified, as the subject may require. The work is, by permission, to be dedicated to Her Grace the Duchess of Northumberland, and will be accompanied with descriptive matter by Sir W. J. Hooker.

NOTICES OF BOOKS.

Genera et Species Palmarum, quas in itinere per Brasiliam descripsit et iconibus illustravit C. F. P. de Martius. *Fol. max.* Monachii. 1823–1850.

If ever an author in any branch of natural science was entitled to say with Horace, *Exegi monumentum aere perennius*, that author is assuredly Professor Charles Frederick Philip von Martius, of Munich. He has revelled among Palms almost all his life; at first in imagination only,—afterwards, for a long series of years, in full reality; applying to them his severest studies and researches. "*In palmis semperparens juventus, in palmis resurgo*," is the motto attached to the likeness of our excellent friend, at this moment before us; and certainly, the fruit of all this has been, the completion of a general work on his favourite family—one of the most difficult—such as has never been surpassed, if ever rivalled, in the literature of Natural History. This superb work, this φοινικῶν, intended at first to be confined to Brazilian Palms only, but afterwards extended so as to comprise a history of the entire family, contains the anatomy, morphology, geography, as well as detailed generic and specific descriptions, of all its known members, illustrated by a vast number of large, exquisitely-coloured figures, representing very many species in their natural state of growth, together with the most minute structural details. We cannot refrain from subjoining the elegant preface, as it will explain the nature of the performance better than anything we can say; and, heartily congratulating the author on the *auspicious occasion* on which this preface is dated, we wish him health and happiness, and long life, in the pursuit of that science, in which he has so eminently distinguished himself. We would further beg to recommend Von Martius's grand work to all those scientific botanists and amateurs, who may fortunately have the means of becoming possessed of it, as one of the most splendid, and, at the same time, most profoundly interesting and classical additions they could possibly make to their libraries:—

"PRÆFATIO.—Palmam quum primum conspexi in Brasiliæ limpidissimam auram emicantem, stirpis venusta majestate perculsus, quæ tamquam blande murmurantibus comis felicem itineris exitum præsagiret, bono hoc augurio commotus illico apud me constitui, palmis impigrum impendere studium, ut de ordine ad id usque tempus non ita bene illustrato novam et certiorem scientiam in patriam reportarem. Quod quidem propositum diligenter ac strenue tenebam, nec sine fructu laboravi, ita ut domum reversus in hoc opere, inchoato auspiciis MAXIMILIANI IOSEPHI I. Bavariæ Regis, qui ipsius itineris auctor extiterat, copiam harum stirpium satis amplam secundum genera et species digerere iconibusque illustrare potuerim.

"Plenior autem Brasiliensium palmarum cognitio docebat, quam plurima in earum structura et formatione summopere facere ad aliarum stirpium, præsertim Monocotyledonearum, conditiones rite pernoscendas, universi autem ordinis omniumque, quæ ad eum pertinerent, generum characteres vix posse dispici et arte critica recte stabiliri, nisi comparatis totius orbis terrarum palmis, quotquot tam adhuc vigentes quam e terræ visceribus effossæ innotuissent. Ita crevit operis suscepti pensum, ad cujus fines promovendos eo alacriore me animo accinxi, quo promptiora amicorum generosa auxilia adessent, felices fructus et ibi spondentium, ubi proprias vires haud suffecturas probe cognoveram.

"Hugo MOHLIUS, Equ., quem priusquam in Universitatis Tubingensis cathedram vocaretur, Monachii per anni et quod excedit spatium nostrum dicere contigit, cum ZUCCARINIO, caro, eheu jam abrepto, capite, in jucundissimam Trifolii botanici consuetudinem conjunctus, palmarum anatomiam pertractandam suscepit. Quantum ille vir in præclara dissertatione, quæ volumen nostrum introductorium ornat, observationis acumine, judicii sagacitate, expositionis ingenuitate, iconum fide præstiterit, id non est, quod lectori commendem. Parem se præbuit FRANC. UNGERUS meus, nunc Prof. Vindobon., qui antiquitatis vegetabilia acri studio perlustrans, palmarum fossilium historiam fideliter æque ac feliciter enucleavit. Hos viros scriptis egregiis,

quæ postea ediderunt (MOHLIUS 'Vermischte Schriften, Tub. 1845, 4to,' UNGERUS 'Genera et Species Plantarum fossilium, Vind. 1850, 8vo') per illas dissertationes quasi prælusisse, id ipsum huic libro summæ fore laudi confido.

"De morphologia deque evolutionis partium historia ut amplius dissererem, præsentis temporis ratio videbatur postulare, quippe quod talium studiorum vim et efficaciam probe perspiceret; unde ut etiam in aliarum plantarum, præcipue Monocotyledonearum, conditiones excurrerem sæpe quidem alliciebar; attamen me cohibui, ne operis limites nimium extenderentur. In his autem rebus investigandis, ut ipsam naturam eamque solam percontarer, posthabita qualibet opinione, id religiose et semper studui, si unice excipias doctrinam de foliorum positione, quam tractavi iisdem innixus principiis, quæ ab ALEX. BRAUNIO meo, Prof. Friburgensi, summa sagacitate sunt exculta et quæ mihi quidem sufficere videantur ad rite perspiciendum processum anthogeneticum, quippe quæ indicent viam, qua vegetabilium Archæus in effingendis partibus incesserit. Controversa quædam et quæ a theoria deflectere videantur non silentio transii, sed tamquam futuris in re ardua et abstrusa perscrutationibus accommodata exposui. Quibus in studiis BRAUNIUM habui semper promptum, qui me et observationibus et consilio adjuvit, quo nomine ut item MIRBELIUM, UNGERUM et SCHLEIDENIUM laudem, qui mihi de evolutione gemmæ, floris et de fœcundatione agenti fuerunt auxilio, grati animi impulsu moveor.—In capite de palmarum rationibus geographicis quæ de aëris et loci potestate generatim deque Floræ imperiis exhibui, Botanicis commendata velim.

"Quod vero ad systematicam descriptionem pertinet, ea duabus partibus absolvenda erat, quum tam de Brasiliæ palmis quam de ordine in universum, de ejus familiis (quas plerique 'tribus' dicere consueverunt) agere, genera stabilire, species certis notis recensere apud me constituissem. At vero in hac re perficienda materiæ, cui omnia superstruenda erant, defectus et raritas, magno fuit impedimento; unde factum est, ut in profligando hoc opere non minus quam XXVII annos detinerer. Quidquid tamen profecerim, nullam mihi laudem arrogo nisi diligentiæ atque constantiæ, reliquam omnem ingenue concedo iis Botanicis, qui transmissis speciminibus tam vivis quam exsiccatis, iconibus, schedulis, observationibus arduo operi succurrere liberaliter voluerunt. Hoc autem beneficio 'amabilis scientiæ' cultores, quibus ad palmas accessus patebat, æquales nostri pæne omnes me obstrinxerunt, ita ut longius foret, si cunctos (quorum nomina ad singulas species adposita invenies) enumerarem; iis omnibus hic gratias maximas ago. Indiæ palmas summa liberalitate mihi transmisere amici spectatissimi G. C. REINWARDTUS, Prof. Lugdun., et NATH. WALLICHIUS dum Calcuttensi horto strenue præesset; Novæ Hollandiæ species earumve icones FERD. BAUERI mira arte confectas debeo Botanicorum nostri ævi antistiti ROB. BROWNIO, quo et magistro et amico uti haud minimæ mihi gloriæ vertendum esse existimo. Mascarensium specimina et icones Commersonianas æque ac Plumerii de palmis Antillanis studia viri amicissimi ADR. DE JUSSIEU et AD. BRONGNIARTUS mihi aperuerunt; peruanas et amazonicas PŒPPIGIUS meus, mexicanarum ab ipso definitarum descriptiones vir cl. LIEBMANNUS, Havnensis, mecum communicarunt. Optimus ALC. D'ORBIGNY ex celebrato itinere per Americam australem reportaverat satis amplam materiem iconibus et descriptionibus illustratam, quam digessi et titulo 'Palmeti Orbigniani' ipsius operi insertam in mei quoque libri usus converti. Præcipuum vero augmentum debeo viro indefessæ industriæ GUIL. GRIFFITHIO; is enim paucis mensibus aute flebilem obitum omnium palmarum ab ipso in longinquis per Indiam itineribus collectarum messem mihi transmisit; atque iconum a ROXBURGHIO, WALLICHIO et GRIFFITHIO in horto Calcuttensi depositarum apographa ex auctoritate supremi Senatus regundarum rerum Indo-britannicarum benevole exhibenda curavit cl. MAC-CLELLAND.

"Hæc omnis operis materies et aliorum auctorum de palmis scripta, inter quæ cl. BLUMEI Rumphia et GRIFFITHII dissertatio in Ephemeridum de Scient. nat. Calcuttensium volumine v. potissimum laudanda sunt, quum deinceps ad me pervenissent, multa et augendi et emendandi mihi data erat opportunitas, quam ne prætermitterem, veritatis studium me adegit.

"Nihilo secius et in hac, qua nunc absolvitur, forma liber meus cum in multis aliis tum in iis, quæ ad generum et specierum characteres pertinent, emendationem expectat a futuri temporis observatoribus, quos difficultatum laborumque haud ignaros, æquum de meo conamine judicium esse laturos spero atque confido. Egregium sane præmium mihi palmæ ipsæ in ipsis laboranti jam rependerunt divinæ, cujus symbolum habentur, pacis afflatu; miro enim solamine me demulcebant, quotiescunque modo publica modo privata calamitate depressus fui atque afflictus, atque 'plantarum principes' eo quoque se mihi palmæ præstiterunt, quod inter absconditarum, quibus reguntur et conduntur, legum indagationem tenebras humanæ mentis fulguratione Summi Numinis luce benigna sensi collustratas.

"Dabam Monachii ex Museo Regio botanico,
die XVII. m. Aprilis a. MDCCCL, natali v."

THE GARDENERS' MAGAZINE OF BOTANY, HORTICULTURE, FLORICULTURE, AND NATURAL SCIENCE; *by* THOMAS MOORE *and* WILLIAM P. AYRES; *assisted by* ARTHUR HENFREY, J. O. WESTWOOD, J. STEVENSON BUSHNAN, M.D., and MR. BARNES. Royal 8vo. Nos. 1, 2, 3, and 4. London. January to April, 1850.

We mentioned in our number for May 'Paxton's Flower-Garden,' by Dr. Lindley and Mr. Paxton, as a work which may be considered a continuation of the 'Botanical Register' of the former gentleman, and of the 'Magazine of Botany' of the latter, united into one. The present is an entirely new publication, undertaken by men whose names are familiar in science and in horticulture, and more miscellaneous in its object, though assuredly mainly horticultural. The first four numbers are now before us, the plates good, though unequal,—many of them, especially the woodcuts, beautiful; and the number of the plates and the quantity of matter (56 pages) are such, that it must require a very large sale to cover the expenses, considering the very low price at which it is offered. This "new publication is intended to be a guide to the practical gardener, and a companion to lady or gentlemen amateurs. It will furnish instructions in the art of designing, laying out, selecting, and planting gardens and pleasure-grounds; in the erection and heating of horticultural buildings; in the application of scientific principles to the art of cultivation; and every other subject connected with the general management of the garden, combined with descriptions of all new popular flowers, fruits, and vegetables." Five coloured plates are given in each number, and, in the four numbers hitherto published, are some forty or fifty woodcuts, of a very miscellaneous character: but many of them are copies from well-known and recently published botanical figures of this country. The descriptive portions, as expressed in the prospectus, are rather popular than scientific.

Of No. I., the coloured plates commence with Tab. 1. *Passiflora Belottii* (a hybrid), and *Maurandia Barclayana*, var. *rosea*. 2. is *Anemone Japonica*, var. *hybrida*. 3. *Pelargonium exiguum*. 4. *Calceolaria flexuosa*, Ruiz and Pav. 5. *Philodendron Simsii* (accompanied by a woodcut). The other subjects treated of are very varied, and illustrated with numerous excellent woodcuts. We can only mention those of the first number. On *Colocasia odorata*, with woodcut. On the cultivation of fancy *Geraniums* (by Mr. Henry Rosier). On *Wild Flowers*, with a beautiful group of children. On *Oxalis Bowieana*, by Mr. James Cox. On the cultivation of *Ixora grandiflora*, by Mr. W. Taylor. On destroying the *Gooseberry* caterpillar, by Mr. H. C. Ogle. A few facts connected with *Orchideous plants*, by Mr. R. Errington. Visits to remarkable gardens—Caledonian Horticultural Society. Reviews. New and rare plants, with excellent woodcuts of *Ixora laxiflora*, *Tabernæmontana longiflora*, *Echinocactus rhodophthalmus*, *Oxalis elegans* (all copied from the 'Botanical Magazine'). Vegetable Physiology, by Arthur Henfrey, Esq. On the culture of *Eriostemons*, by Mr. George Freeman. The Principles on which Plants are Propagated by Cuttings, by Mr. William Keane. *Domestic Gardening* (No. 1), by Mr. J. Spencer. Extracts and Memoranda. On the culture of *Verbena* for exhibition, by Mr. Barnes. Covering, in its general application to glazed and other horticultural structures, by Mr. George Smith. Professional and moral training (No. 1), by Mr. W. P. Keane. Miscellaneous notices. In short, the number is a volume in itself.

We can only notice the original coloured figures of the remaining numbers. No. II. *Salpiglossis sinuata*, var. *flava*. *Rhodostoma gardenioides*, Scheidw. (a rubiaceous plant of unknown origin). *Chorozema flavum* and *triangulare*. *Erica elegantissima*. Double *Hyacinth*. No. III. *Geissomeria longiflora*, Lindl. *Æchmea discolor*. *Echeveria retusa*, Lindl. *Pentstemon heterophyllus* and *Camellia Drysdalii*. No. IV. contains, of coloured plates, *Gastrolobium Hugelii*, *Ceanothus papillosus* and *dentatus*, *Warrea Lindeniana* and *Conoclinium ianthinum*; besides an admirable coloured plate of *Rose Insects*; for the Entomological department is introduced and conducted by a masterly hand, *viz.*, J. O. W.

The woodcuts are equally numerous, and, as well as the coloured plates, equally beautiful with, if not superior to, those in the preceding numbers, and the miscellaneous matter is equally good and varied.*

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* Having had occasion to speak, perhaps with more favour, of the last number of the '*Gardeners' Magazine of Botany*,' even than of the preceding numbers, as regards the plates, it is only due to the author of the '*Flower Garden*,' noticed in our Journal for May, to say, that our disapprobation there expressed at the coloured plates was only directed to Nos. 1 and 2. No. 3, since published, exhibits such a manifest improvement, that the figures may rank with the best botanical plates of the present day; and we do not doubt they will continue to deserve that character.

Journal of an Excursion from SANTAREM, *on the* AMAZON *River, to* OBIDOS *and the* RIO TROMBETAS; *by* RICHARD SPRUCE, ESQ.

(*Continued from p.* 208.)

December 23.—Last night our men slept on the sail which they had spread on the sand near their fire. Mr. King joined them, but I remained in the canoe, for the purpose of being near my instruments, if the sky should prove clear enough for an observation. The sandbank was here and there ridged up, with minute lagoons in the hollows, some not more than two feet in diameter—these served me excellently for artificial horizons. In the early part of the evening a meridian altitude of α Eridani gave for latitude of our station 1° 26″ S. I was very desirous of obtaining a lunar distance, but the moon was too near the zenith for my sextant to take her double altitude, and when I rose twice afterwards during the night, the sky was much overcast.

At five this morning, the temperature of the air was 76°, and of the water near our canoe $85\frac{1}{2}$°, the depth being only three feet. We started at six, and by half-past eight reached the end of the island on our left, where a small river called Jarauacà enters from the west. Our course now veered rapidly round to N.E., and then to E., sandbanks still appearing, and the river in general so shallow that the canoe almost everywhere scraped the bottom. Sometimes we had to turn back to seek other channels that would admit our passage. The river, narrowing, turned by a large curve to N. by E., the convex side being steep, probably sixty feet high, but apparently alluvial, and without any trace of rock. On it were growing an *Adiantum*, a minute *Fissidens*, and *Fossombronia pusilla*—the identical species, I believe, so well known in Europe. The river now became rather tortuous: we had first a short reach to N., then, after a long time, a reach to N.E. of about half a mile, afterwards a short reach to N., and then suddenly veered round to E. Here, in one place on our right, rose a steep shelving cliff of reddish clay, without wood. Suddenly the river turns to N. by E., having on its right bank a good many Assaí palms—a species which we had seldom met with since leaving the great delta of the Amazon. The river now begins to assume a westerly direction, forming a wide and long bay, the general direction of which is N.W. by W. On our left we had a large tartaruga-bank, on which we landed a little before five P. M., to dry our paper. This daily and very necessary task had of late become very difficult, for we had little spare room in the canoe where the paper could be exposed to the sun, and great care was necessary to prevent its being blown into the water; so that I made a point of selecting a suitable place for spreading it out whenever we landed to cook our principal meal, and thus prevented any sacrifice of time. These sandbanks were the only places in the Aripecurú where we could find open space enough, and, when dry, they certainly answered admirably; for the sand became so intensely hot as to scorch our bare feet, and a little of it put on the top of each parcel aided the process of drying, at the same time that in ordinary cases it prevented the wind from blowing away the paper. This day I was rather fearful of a small cloud which had hung on our rear for some time; but as the men assured me that it would not come our way, and as not a breath of wind was stirring, I ventured on speading out our paper in the middle of the sandbank, which was perhaps of sixty acres in extent. I then went into the water to bathe, thinking all secure. Suddenly the cloud comes forward—a trovoádo rises—the sheets are whirled into the air like so many feathers, and carried off towards the water. Mr. King and the men are out in the direction of the flying sheets—I also run into the midst of them—we catch what we can in our arms and cover them with sand, but a great quantity is swept into the water. None but a botanist can conceive what were my sensations at this moment! The whole of this drying-paper was Bentall's; and although it had not been the best in the world, its loss would have been irreparable; for how supply its place in this savage wilderness, when even at Obidos I had found it impossible to procure any paper but the ordinary white writing-paper? Fortunately, Bentall's paper is so porous, that the moment it touched the water it became saturated and sank, so that, with a little care and patience, we were able to fish it all out. When thus soaked it formed a load for a strong man, and it was not perfectly dried until two days afterwards; but I believe that not a single sheet of it was completely lost.

December 24.—Remained all night on the sandbank. No observation, the sky being too cloudy. Temperature this morning exactly the same as yesterday, at the same hour. During the night a jacaré came and warmed himself at the fire—attracted, probably, by the remains of turtles' eggs on which the men had supped. No one saw him; but his footsteps to and from the water, and in the channel near the canoe, were distinctly traceable. I heard something in the night puffing near the canoe, and lay listening to it, fancying it to be one of the men. We had bathed the preceding day in the very spot where he took the water.

An hour's pushing brought us to the commencement of a long reach to N. by W., the view terminating in low serras, three ridges of which were distinguishable. The morning had been very foggy, and we had now smartish rain for an hour and a half, coming from the serras. Beyond this reach the river makes a long turn to W.N.W. On the right bank appear above water a few rocks of dark-coloured sandstone. Throughout the voyage our ears had been saluted night and morning by the horrid cry of guaríbas, which I can compare to nothing but the screaming of some hundreds of pigs about to undergo the last penalty of the law. Sometimes they were so near that their howl was quite deafening, and yet we had never had the satisfaction of seeing one. This morning our curiosity was gratified by the sight of a whole troop of them, scampering away from the margin of the river, through the tree-tops. We heard, also, several times, another monkey, the coatá, and got a good view of one, a big black fellow, with a red face. Amongst the birds, the most noisy, and perhaps the most numerous, were the parrots, which flew over us in flocks, about sunrise and sunset; but there was also a small pigeon, which descended the river very early in a morning, and ascended it about dark, flying very low, in flocks of not more than from twenty to fifty, but following each other in very quick succession, two or three flocks passing every minute.

After a short curve in an easterly direction, the river now turns N.W. by N., and makes a short reach; then, with a considerable curve, it veers to N.N.E. On entering this long reach, the high Serra de Camaú appears, bearing nearly due north. In front of this serra, we were told, lay the cachoeiras.

December 25.—Last night was gloomy throughout, with occasional drops of rain. Our quarters were once more a sandbank, on which the men were successful in finding good store of turtles' eggs, and in intercepting not a few young turtles. I was much disgusted by their filling a panella with the latter—a reptile rather smaller than common toads in England, and of very similar aspect,—setting them on the fire, all alive as they were, and boiling them; then eating them entire, with the exception of the shells.

Our course this morning is generally north—the river narrows—sandbanks disappear—rocks peep out right and left, dipping to S.S.E. at a small angle, and gradually increasing, as we proceed, to overhanging and dripping cliffs, which nourish a few ferns and mosses. Numerous little bats, the size of ordinary moths, flit about under these cliffs, or stick to them in long lines. From the banks of the river rise abrupt hills, thickly wooded, and displaying here and there a noble specimen of the Inajá palm (*Maximiliana regia*, Mart.), which is not very common in this region. After traversing a long reach to the north, our course turns gradually westward. The current is more rapid—rocks stand out of the water here and there, or (still more dangerous) are concealed by a thin covering of water, requiring the man at the prow to keep a careful look-out. The scenery is beautiful: the slopes of the hills are covered with an unbroken mass of foliage in its freshest state, the slender white stems and large white leaves of the *Imbaüba* mixing most agreeably with others of deeper hues; while here and there comes rushing down over rocks a slender rivulet, with a sound most delightful to my ears, from not having been previously heard since my departure from England.

By midday we arrived at moorings, at the foot of the first cascade, in a small still bay on the east side of the river, with two tall Jauarí palms exactly in front, and close by a fine sandy praya, skirted by numerous *Açara* bushes, which, being now covered with their snowy blossoms, resembled so many hawthorns, and emitted as delicious a perfume. For the last hour our course had been up rapids—two men hauling on shore by a strong sipó fastened to the prow, and the third with a pole sustaining the canoe from being dashed against the rocks at the margin and under the water, but with all his address not preventing us from receiving now and then a hard knock. We had all been anxious to reach the cataracts: this we had now safely accomplished; and, as it was Christmas-day, I determined that for the remainder of the day we would all rest from our labours. In the evening Mr. King and I drank the Yorkshire toast of "A merry Christmas and a happy new year" to our absent friends, in cashaça, considerably diluted with the water of the cachoeiras.

I shall here throw together such observations as I was able to make during a stay of five rainy days and nights at the falls of the Aripecurú.

I did not succeed in getting a single satisfactory observation of the sun or a star at its meridian passage, in consequence of the unpropitious sky. To the north and south—that is, up and down the river—the sky was constantly obscured by mists and clouds to a considerable altitude, and it was only once that I caught a distinct view of Achernar near the meridian: his altitude gave for the latitude of our station 0° 47′ S., but as he had certainly passed the meridian by at least five minutes, this latitude may be two or three minutes too small.

The following temperatures were noted, and there was never a difference of so much as half a degree at the same hour of any day:—Temperature of air near canoe, at midnight, 75°, at five A. M., 75°; of air in the forest at five A. M., 73°; of water of cachoeiras at five A. M., 83½°. From five in the morning until sunrise, the temperature exhibited no variation, and there was not that sudden fall in the thermometer which we remark a few minutes before sunrise in the temperate zone, and especially in mountainous regions.

Between the last tartaruga-bank and the cachoeiras, three igarapés enter on the left and three on the right. The highest point which we reached above this was about six hours' journey from our station, and the distance may safely be assumed at as many miles, so slow is one's progress when a way has first to be cut. This was on the left bank, for the right is so steep as to render it impassable. In this space seven igarapés enter the river on the east side, some of considerable size, and the volume of water ought to diminish as we ascend, yet this is scarcely apparent. There are, besides, in the valleys, obvious marks of many additional winter-torrents. The breadth of the river varies from two hundred yards to half a mile, expanding between the cachoeiras, of which there are six in the same space, the first over slate rock, the rest over slate and granite. The highest fall may be fifteen or eighteen feet, but even this was not an uninterrupted cascade at this season. In the strength of the rainy season, when it is said that there is depth enough for large vessels to ascend to the very foot of the cachoeiras, the rush of water must be immense. A little above the first fall, blocks of granite make their appearance, extending from the shore some distance into the forest. In the same place the river begins a wide curve to N.W.

In ascending the Aripecurú, the first rock that appears is apparently the same coarse dark-coloured sandstone seen at Obidos and Parà; it dips at a small angle to S.S.E. A little before reaching the cachoeiras, crops out from beneath this a soft red and yellow sandstone,* which in its upper strata becomes slaty. Then at the cachoeiras we have real slate rock, of a purple or purplish-grey colour, in beds, also dipping to S.S.E., at an angle of 10°. It cleaves principally in two directions (besides that of the strata), the lines indicating which run from E.S.E. to W.N.W., and from N.E. to S.W. There are also other lines, less regular and distinct, one of which runs N.W. by W. ½ W. From below the slate emerges the granite, which is very coarsely grained, and seems to contain all the usual constituents of that rock. I send specimens of all these rocks.

The forest near the cachoeiras is exceedingly dense and moist; it is consequently always cool, even at midday, and our Tapuyas, who were very sensitive to changes of temperature, complained of being dreadfully cold. It contained many magnificent trees, among which the most conspicuous were the *Castanheira*, the *Sapucáya*, and two or three other *Lecythideæ*. The whole district of the Trombétas and Aripecurú abounds in *Castanhas*, and, in the season for collecting them, which is the middle of winter, troops of Indians ascend these rivers. Other trees worthy of note are the *Uapuí*, appearing like clustered gothic pillars, the *Itaüba*, the *Caraipé*, &c. The *Itaüba* we had seen in plenty also near the Lago de Quiriquiry, but neither there nor here did we meet with any which were sufficiently slender to admit of their being ascended or cut down. It is a noble and clean-growing tree, with rather shaly bark, which, having besides a slight tinge of red, gives the trunk the appearance of that of the Scotch fir, though the leaves proclaim it to belong to a very different family. Near Santarem it is becoming rather scarce, but I am now waiting in hopes of shortly procuring it in flower.

The Palms which I noticed were the *Inajá*, *Jauarí*, *Murumurú*, *Assaí*, *Marajá*, *Ubim*, *Cunhaí*, a *Desmoncus*, and some small *Bactrides*. All these, with the exception of the *Jauarí* and *Cunhaí*, I had previously seen at Parà, which proves that many palms have a wide distribution, at least in longitude.

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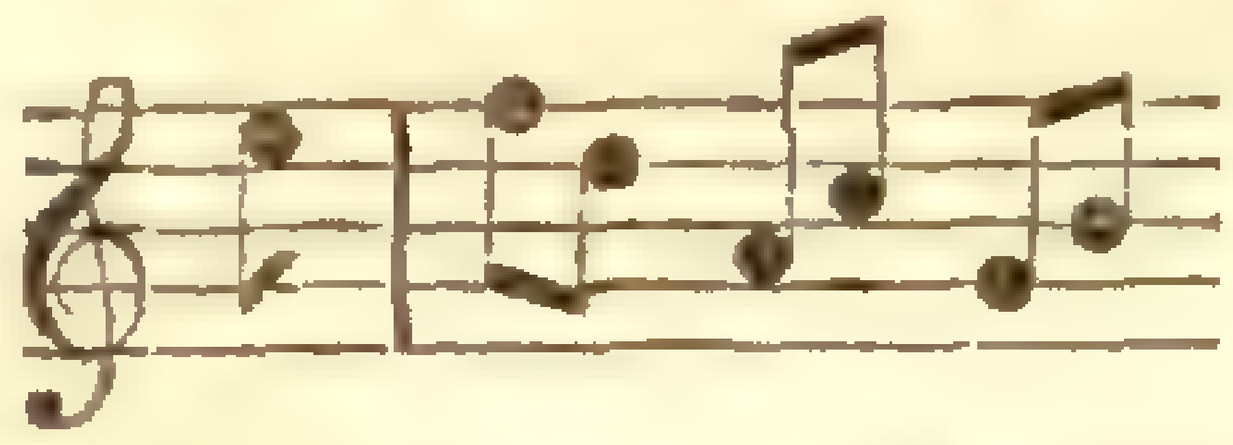
* When this rock is broken, spherical nodules of a purple colour and the size of apples frequently turn out. They consist of a stony crust, filled with earth of the same colour. I send one.

On the eastern side of the river we found a good number of *Ferns* and *Orchideæ* in the trees, but of the latter only one species in flower—a tall *Epidendrum*, with panicles of dark orange flowers. This was growing in the top of a tree, laid over at a considerable angle, and consequently not difficult to ascend: I, therefore, immediately set to work, and, having nearly arrived at the plant, put forth my hand to pull away a large tuft of *Tillandsia* that grew in my way, when a tiger-cat bounded from behind it, reached the ground in a twinkling, and disappeared in the forest. On the western side, which was abrupt and rocky, we gathered some interesting *Ferns*, growing in the bed of a rivulet, on the soft sandstone above-mentioned. I was delighted to find the rocks at the cachoeiras clad with a very pretty *Podostemacea*, with pale violet flowers, and fronds resembling a deer's horn, recalling some Lichens of the genera *Cladonia* and *Cetraria*. I should suppose it a *Lacis*, but that there is certainly an involucre present, of minute subulate scales. The filaments are connate in parcels of two or three, but free at the summit, and the anthers are sagittate. The most remarkable circumstance about this little plant is that it actually eats holes into the hard rocks on which it grows, so that their surface appears like honeycomb. I send you fragments of rock thus corroded on the surface. It reminds one of the way in which the surface of chalk rock is dimpled by the minute plants of *Weissia calcarea*, and by certain *Verrucariæ*. I found a second species, much more slender, but without flowers, in a rivulet in the forest. On the steep banks below the cachoeiras we got some fine plants, especially a Rubiaceous tree, fifty feet high, with ample entire leaves and panicles of numerous yellow-and-red flowers. Our mulatto was very useful in procuring specimens of this and several other things: the facility with which he ascended a tree and moved about among its branches was quite marvellous.

Some rocks of the cachoeiras have a deposit on them like black varnish;—does it contain manganese? I have some recollection of Humboldt's finding a similar deposit at the cataracts of the Orinoco, but I have not his Travels to refer to. Some stones are similarly varnished with an ochry yellow.

In the middle of summer, animals are said to be very numerous, but we did not see many. They include Onças, Tamanduás, Porcos do Mato, &c. The sandy summits of the hills are much burrowed by the Cutía. Of monkeys we heard and saw plenty, especially Coatás. Among the birds are the Gallo de Serra and the Mutún, the latter much resembling a turkey. In the forest, west of the cachoeiras, we had the satisfaction of listening for some time to a curious little bird called *Uyerapurú*, respecting which marvellous tales had been told us as we ascended the Trombétas, and especially that "it played all manner of tunes, for all the world like a musical snuff-box!" Its notes are certainly exceedingly sweet and clear, and as accurately modulated as those of any musical instrument: to my ear they most resembled the tones of an instrument I have seen in England, consisting of strips of glass suspended across two pieces of tape, and beaten by cork plectra;—if I mistake not, it is called an harmonicon. They are also considerably varied; after singing one set of notes perhaps twenty times over, with intervals between the repetitions, the bird will suddenly change to another set, and continue them for an equal space of time. Supposing it to commence in the key of *do*, it frequently changes to that of *sol*, and nearly always ends on *si*. The following passage often occurred:  which, it will be observed, contains every note in the scale. The songster itself is said to be of most insignificant appearance, and not to exceed in size some of the humming-birds. We were not, however, favoured with a sight of it, and we were afraid to move towards it, lest our rustling among the bushes should dissolve the spell, for certainly the sound seemed to come from fairy-land rather than to belong to this earth. We were informed—whether truly, I know not—that the *uyerapurú* is unknown except at the cachoeiras of the Aripecurú.

We found a beautiful frog among moist shady rocks and tree-roots. It had the belly and legs of the deepest indigo-blue, the back black, with a green band on each side, commencing at the nose, and running the whole length of the body, and the toes were papillate.

(*To be continued.*)

Report on the Dried Plants collected by MR. SPRUCE *in the neighbourhood of* PARÁ *in the months of July, August, and September,* 1849; *by* GEORGE BENTHAM, ESQ.

(*Continued from p.* 212.)

The *Leguminosæ* amount to forty-nine species. The herbaceous ones are not of much interest, except the curious and rare *Sœmmeringia semperflorens*, Mart., of which, unfortunately, there were but very few specimens. The frutescent and arboreous kinds contain several new species.

Lonchocarpus? *glabrescens*, sp. n., scandens, foliolis 9 ovali-oblongis vix coriaceis supra glabris subtus pallidis minute puberulis, racemis folio longioribus, floribus pedicellatis fasciculatis, calycibus petalisque omnibus puberulis, staminibus monadelphis, alis carinam valde arcuatam rostratam æquantibus.—Frutex alte scandens, ramulis ultimis tenuibus teretibus glabriusculis. Stipulas non vidi. Stipellæ minutissimæ caducissimæ v. omnino desunt. Foliorum petiolus communis 3–4-pollicaris, fere glaber. Foliola 2½–3 poll. longa, 1–1½ poll. lata, breviter acuminata, basi acuta v. rotundata, supra glabra at non nitentia, subtus pube adpressa conspersa, costa media venisque utrinque 5–7 parallelis subtus prominulis, venulis reticulatis pellucidis, cæterum haud punctata, petiolulo sesquilineari. Racemus 9–18-pollicaris, fere a basi florifer, ramulis more *Phaseolearum* nodiformibus, infimis linea paulo longioribus, superioribus brevissimis plurifloris. Pedicelli circa 2 lin. longi. Bracteæ parvæ, oblongæ, caducæ. Calyx late campanulatus, truncatus, minute 4-dentatus, dente summo latiore vix conspicuo. Vexillum semipollicare, late orbiculatum, recurvum, extus pube tenui subsericeum, intus supra unguem minute bicallosum. Alæ vexillum subæquantes, angustæ, valde arcuatæ, extus sparse pilosulæ. Petala carinalia dorso carinata, alis latiora, extus puberula, rostro obtuso glabro. Staminum tubus fere a basi integer, ima tantum basi filamentum vexillare breviter liberum est. Discus perigynus annularis. Ovarium sessile, tomentellum, ovulis circa 10. Stylus parce hirtellus, summo vertice capitato-stigmatosus.

From the neighbourhood of Parà. This species is nearly allied to *L. rufescens*, *L. densiflorus*, and several other tropical American species, in none of which is the fruit known so as absolutely to fix their genus.

The *Drepanocarpus* distributed as *D. lunatus var.*, has the leaves much smaller than the ordinary West Indian and Guiana form, but it is probably not a distinct species.

Amphymenium? *floridum*, Benth., is the same which I published in the Ann. Mus. Vind. vol. ii. p. 106, as *Phellocarpus floridus*. I had then not seen flowering specimens of any true *Amphymenia*; and as among Martius's plants were four species, to all appearance congeners, all in flower, and one having also very singularly formed corky fruits, I concluded that such might probably be the pod of the whole of them, and established the genus *Phellocarpus*. More ample materials, since examined, give me reason to believe that most of the species belong to *Amphymenium*, and even the *P. Amazonum* itself may prove to be a diseased state of *A. floridum*. The real fruit of this species is, however, as yet unknown, although I have seen flowering specimens gathered by various collectors. It is very nearly allied to the *A. Rohrii*.

Dipteryx *applanata*, foliis oppositis, petiolo applanato aptero, foliolis oblongis acuminatis coriaceis utrinque glaberrimis, panicula canescente, calyce canescenti-puberulo, labii inferioris dentibus lateralibus minutissimis v. nullis, staminibus 10.—Arbor pulcherrima, ramis divaricatis, *D. oppositifoliæ* valde affinis. Foliola multo minora, 3–4-pollicaria nec semipedalia, basi obtusiora, acumine longiore obtuso. Panicula brevior, latior, floribus numerosioribus. Calycis labii inferioris dentes laterales multo minus conspicui v. omnino evanidi.—Caripi on the Rio Parà, *Spruce*; Borba, on the Rio Madeira, *Riedel*; Cayenne, *Martin*.

I know not whether this be the tree which furnished the Tonga Bean, n. 29 of the Kew List, as that was gathered from another locality without foliage, and another species, *D. nudipes*, Tulasne, nearer allied to the true *D. odorata*, is known to grow in the neighbourhood of Parà. Neither of Aublet's species appear to have been found in Brazil; the one I had described as *D. oppositifolia*, in the Ann. Mus. Vind. vol. ii. p. 110, was most probably the *D. applanata*, for I had then not seen specimens of the Guiana plant. The genus is now known to consist of at least eight species, which may be characterized as follows:—

1. D. *odorata*, Willd., foliis alternis, petiolo alato, foliolis amplis oblongis inæquilateris coriaceis, panicula floribusque ferrugineo-

tomentellis, calyce eglanduloso, staminibus (an constanter?) 8.—Cayenne.

2. D. *alata*, Vog., foliis alternis, petiolo alato, foliolis ovatis oblongisve inæquilateris, panicula canescenti-puberula, calyce glabriusculo pellucido-punctato eglanduloso, staminibus 10.—*D. pterota*, Mart.—Provinces of Goyaz, Minas Geraes, and Mattogrosso.
3. D. *nudipes*, Tulasne, foliis alternis, petiolo aptero applanato, foliolis ovato-ellipticis longe acuminatis coriaceis subæquilateris, panicula pubescente, calyce extus glabro eglanduloso, staminibus 10.—Parà.
4. D. *reticulata*, sp. n., foliis alternis, petiolo aptero applanato, foliolis ovatis obtusis emarginatisve subæquilateris coriaceis glaberrimis eleganter reticulatis, panicula puberula, bracteolis coloratis calyce majoribus, calyce glabriusculo vix punctato, staminibus (an constanter?) 9.—Foliola circa sex, 2–2½-pollicaria. Panicula laxa. Bracteolæ deciduæ, fere petaloideæ, multo majores quam in cæteris speciebus.—Guiana, *Rob. Schomburgk*, 2nd Coll. n. 606, *Rich. Schomburgk*, n. 951.
5. D. *crassifolia*, sp. n., foliis oppositis, petiolo anguste marginato, foliolis ovatis v. ovali-oblongis subacuminatis crasse coriaceis supra glabris subtus canescentibus, panicula canescente, calycibus extus puberulis subepunctatis, staminibus 10.—Foliola breviora, latiora, crassiora quam in *D. applanata*, pedicellis longiore.—British Guiana, *Rob. Schomburgk*, from among the single specimens of his last journey.
6. D. *oppositifolia*, Willd., foliis oppositis, petiolo applanato aptero, foliolis oblongis vix acuminatis subcoriaceis utrinque glaberrimis, panicula canescente, calyce canescenti-puberulo vix punctato, labio inferiore tridentato, staminibus 10.—Rio Quitaro, British Guiana, *Schomburgk*; and Cayenne, *Aublet*.
7. D, *applanata*, described above.
8. D. *oleifera*, the Eboe-tree of the Mosquito shore. Of this I have only seen the fruit, and a single flower lent to Sir W. J. Hooker, showing that it belonged to a distinct species, with the two calycine lobes larger than in any other, and thickly covered with resinous dots.

The genus *Pterodon* of Vogel (*Commilobium* of my paper in the Vienna Annals) only differs from *Dipteryx* in the more petaloid nature of the calycine lobes, in the flattened fruit, very thin and almost winged round the edge, and in foliage. It consists as yet of three species: 1. *P. abruptus* (*Commilobium abruptum*, Moric.); 2. *P. emarginatus*, Vog. (*Commilobium pubescens*, Benth.); and 3. *P. polygalæflorus* (*Commilobium polygalæflorum*, Benth.),—all from Brazil.

Sclerolobium *tinctorium*, sp. n., foliolis 6–8-jugis oblongis acuminatis basi subobliquis et parum inæquilateris utrinque sparse hirtellis glabratisve viridibus, floribus sessilibus, calyce florescente sericeo, petalis glabris.—Arbor ramulis novellis ferrugineo-pubescentibus. Stipulæ rigidæ, profunde partitæ, laciniis setaceis subteretibus. Foliorum petiolus communis 6–9 poll. longus, pilosulus v. pubescens. Foliola omnia opposita v. paris ultimi dissita, breviter petiolulata, 3–4 poll. longa, 1–1½ poll. lata, acumine sæpius elongato obtuso v. acutiusculo, plus minus obliqua et inæquilatera, consistentia laurina. Panicula more generis ampla, ramosissima. Flores in ramulos ultimos dense spicati, iis *S. paniculatæ* similes sed sessiles. Calycis tubus brevis, hemisphæricus; limbi laciniæ paulo longiores, late ovatæ, obtusissimæ, concavæ, membranaceæ, extus pube tenui canescentes v. flavidæ. Antheræ et pili filamentorum aureæ. Petala filiformia, vix calyce longiora. Stamina subduplo longiora, basi copiose pilosa, apice nuda. Ovarium breviter stipitatum, pilis longis hispidum; ovulis circa 6.

Caripi, on the Rio Parà. Mr. Spruce states that it is a tree of about fifty feet, with a rough bark, abounding in tannin, and used as a dye.

This handsome genus now contains the nine following species:—

1. S. *denudatum*, Vog., foliolis 2–3-jugis oblongis basi angustis (æqualibus?) glabris, floribus sessilibus, calycibus aureo-hirtis.—South Brazil.
2. S. *macrophyllum*, Vog., foliolis 5–6-jugis subovato-oblongis breviter lateque acuminatis basi rotundatis (æqualibus?) glabris, pedicellis brevissimis.—Cujabà in Mattogrosso.
3. S. *hypoleucum*, sp. n., foliolis 2–3-jugis ovatis subacuminatis basi rotundatis subæqualibus supra glabris subtus pube minuta sericeo-nitentibus, floribus breviter pedicellatis, calyce incano-sericeo, petalis pilosissimis.—Woody hills at Barra do Rio Negro, *Riedel*.
4. S. *chrysophyllum*, Pœpp., foliolis 4–6-jugis oblongis basi rotundatis inæquilateris acuminatis supra glabris subtus sericeo-nitentibus pallidis, floribus sessilibus, petalis glabris.—*S. sericeum*, Tulasne.—Ega, on the Amazon.

This species was published at about the same time by Pœppig, in his Nova Gen. et Sp., and by Tulasne, in his accurate paper on North American Woody *Leguminosæ*; but as Pœppig's specimens served in both cases for description, his name deserves the preference, besides that we believe he had in fact the priority, although by too short a period for Mr. Tulasne to have been aware of it.

5. S. *paniculatum*, Vog., foliolis 2–6-jugis oblique oblongis v. ovato-lanceolatis basi obtusis inæquilateris supra ad costam hirtellis subtus sericeo-nitentibus, floribus pedicellatis, calycibus albo-sericeis.

Apparently common in Goyaz and Mattogrosso. I have, also, a narrow-leaved variety from Goyaz (*Gardner*, n. 3115), and a variety with small flowers and smoother leaves, possibly a distinct species, from Santarem (*Riedel*).

6. S. *tinctorium*, above described.
7. S. *guianense*, sp. n., foliolis 5-6-jugis oblongis basi rotundatis inæquilateris, adultis utrinque glaberrimis coriaceis, panicula ferrugineo-hirta, floribus subsessilibus, calyce rubescenti-tomentello, petalis basi pilosis.—Near *S. tinctorium*, but the leaflets are fewer, larger, and more coriaceous. Cayenne, *Martin*; British Guiana, *Rob. Schomburgk*, 2nd Coll. n. 598, *Rich. Schomburgk*, n. 931.
8. S. *rubiginosum*, Mart., foliolis 4–6-jugis oblongis crasse mucronatis basi valde obliquis inæquilateris supra ad costas subtus undique ramulis paniculaque ferrugineo-pubescentibus, floribus pedicellatis, calyce incano-sericeo, petalis glabris.—Cujabà in Mattogrosso. Described in detail by Tulasne in the above-mentioned paper.
9. S. *rugosum*, Mart., foliolis 4–6-jugis oblongis basi obliquis inæquilateris supra glabriusculis rugosis subtus ramulis paniculaque tomento adpressissimo ferrugineis, floribus sessilibus, calyce ferrugineo-tomentoso, petalis pilosis.—Ramuli petioli et rami paniculæ profunde sulcati. Foliola magnitudine *S. chrysostachyos* et *S. guianensis*, coriacea, et insigniter rugosa.—Cujabà in Mattogrosso, and Minas Geraes, *Martius*, Herb. Fl. Bras. n. 1155, but we believe not yet described.

The most remarkable among Mr. Spruce's *Cassiæ* is the *C. fastuosa*, Willd., not a common one in collections, and of which there are a few very handsome specimens. There is, also, a single one of the following very distinct new simple-leaved *Swartzia*.

Swartzia (Possira) *racemosa*, sp. n., foliolis solitariis brevissime petiolatis ovali-ellipticis abrupte acuminatis coriaceis glabris supra nitidulis aveniis subtus glaucescentibus, racemis folia subæquantibus multifloris, pedicellis brevissimis, petalo orbiculato, staminibus numerosis.—Ramuli glabri. Stipulæ lineares, rigidulæ, persistentes, 2–3 lin. longæ. Petiolus communis omnino deesse videtur; petiolulus 2 lin. longus. Foliolum 3–4 poll. longum, 1½–2 poll. latum, costa media supra impressa subtus prominula, venis subtus paucis parum prominentibus, supra omnino inconspicuis; acumen angustum, 3–4 lin. longum. Racemi ferrugineo-tomentosi, jam infra medium floriferi. Bracteæ lineares, rigidulæ, pedicello sublongiores, accedunt etiam sæpe bracteolæ 2 minutæ setaceæ ad basin pedicelli. Pedicellus vix lineam longus. Alabastrum globosum, 2 lin. diametro. Calyx extus tenuiter tomentellus, intus glaber. Petalum breviter unguiculatum, circa 6 lin. diametro. Stamina majora 5, minora numerosa. Ovarium vix 3 lin. longum, glaberrimum, lunato-falcatum; sutura ovulifera recta, dorsalis semicircularis; stipes ovarium ipsum æquans; stylus brevissimus, uncinatus.—At Caripi, on the beach of the Rio Parà. A tree of sixty feet in height, called by the Brazilians *Caraipé-rano.*

I take this opportunity of characterizing another new simple-leaved *Swartzia*, from British Guiana (*Rob. Schomburgk*, 2nd Coll. n. 548, *Rich. Schomburgk*, n. 852):—

S. (Possira) *oblonga*, foliolis solitariis breviter petiolatis anguste oblongis coriaceis nitidis venosis glabris, racemis laxe paucifloris ferrugineo-tomentellis, petalo majusculo orbiculato, staminibus numerosis, ovario stipite subbreviore.—Ramuli novelli et inflorescentia tomento tenui ferruginei. Petiolus infra articulationem (*i. e.* petiolus communis) 1–2 lin. longus, ad articulationem minute bituberculosus, supra articulationem (petiolulus) vix lineam longus. Foliolum 2½–4 poll. longum, venulis numerosis reticulatis utrinque conspicuis. Racemi folio breviores, 2–5-flori. Bracteæ minutæ. Pedicelli 4–5 lin. longi. Petalum 8–10 lin. diametro. Ovarium *S. racemosæ*, stipite tamen longiore.

There were two or three specimens of a *Vouapa*, which I named *V. bifolia*, Aubl.; but upon carefully working up the genus as far as my materials admitted, they appear to me rather to belong to the *V. phacelocarpa*, Hayne. I have not, however, seen the fruit, and

I have some doubts whether both *V. staminea*, DC., and *V. phacelocarpa*, may not be mere varieties of *V. bifolia*. The following, however, which was generally distributed, is a perfectly distinct species from any of the five previously published.

Vouapa *angustifolia*, sp. n., foliolis sessilibus oblique lanceolato-oblongis, racemis folio brevioribus, bracteis ovatis acuminatis alabastrum acuminatum æquantibus, ovario glabro v. ciliato.—Ramuli ramosissimi, tenues, teretes, glabri. Stipulæ minutæ, ovatæ, caducæ. Petiolus communis 3–5 lin. longus, seta nulla. Foliola 2–5 poll. longa, $\frac{3}{4}$–1 poll. lata, basi oblique acuta, glaberrima, coriacea, uninervia, crebre et tenuiter transversim parallele venosa, et inter venas reticulata. Racemi 2–3-pollicares, pube aurea v. canescenti tomentosi. Bracteæ 3–4 lin. longæ, concavæ, extus tomentosæ, intus glabræ, per anthesin deciduæ. Bracteolæ ovatæ, acuminatæ, concavæ, extus tomentosæ. Calycis laciniæ glabræ, ovatæ, acuminatæ, bracteolis paulo breviores. Ovarium versus margines pilis nonnullis ciliatum nec tomentosum.—On the banks of an igarapé of the Rio Parà, near Caripi, *Spruce*; on the Amazon, *Riedel*.

Among sixteen *Mimoseæ*, there are several interesting species, and one new *Inga*, which I have great pleasure in naming after its discoverer.

Inga (Burgonia) *Spruceana*, sp. n., glabra v. vix puberula, foliolis 4–5-jugis ovatis oblongisve obtuse acuminatis basi inæqualiter angustatis submembranaceis, petiolo vix sub jugis dilatato, glandulis elevato-scutellatis, spicis aggregatis breviter pedunculatis breviterque oblongo-cylindraceis, calyce ovoideo corolla triplo breviore, tubo stamineo longe exserto.—Arbor ramulis tenuibus. Petioli 4–7-pollicares, tenues, glabri v. vix puberuli. Glandulæ inter omnia paria, haud magnæ. Foliola breviter petiolulata, 3 v. rarius 4 poll. longa, 1–2 poll. lata, consistentia quam in affinibus multo tenuiore. Spicæ in ramulos breves e nodis vetustis ortos v. ad axillas foliorum fasciculatæ, cum pedunculo pubescente 3–5-lineari vix pollicem excedunt. Bracteæ minutæ, acutæ. Calyx semilineam longus, puberulus, breviter dentatus. Corolla infundibuliformis, fere glabra; tubus fere lineam longus; limbus latus, profunde 5-fidus, $\frac{3}{4}$ lin. longus, laciniis acutis. Staminum tubus corolla duplo longior.—A tree of fifty feet, with whitish flowers; found on the Unah road, near Parà.

The *Caraipé*, or Pottery-tree, No. 19 of the Kew list (p. 73), was not found either in flower or fruit. The specimens sent of the foliage would, from the texture and arrangement of the leaves and stipules, induce me to suppose that it may belong to the order of *Chrysobalanaceæ*, and probably either to *Parinarium* or *Licania*, although I am not acquainted with any species with which it perfectly coincides. There are also five other *Chrysobalanaceæ*, including what I take to be the *Moquilea Paraensis*, Mart. et Zucc., but which would be transferred to *Couepia* as limited in 'Hooker's Journal of Botany,' vol. ii. p. 212; and the following:—

Licania (Hymenopus) *macrophylla*, sp. n., foliis oblongis breviter cuspidatis basi obtusis obliquis glabris nitidis, panicula divaricato-ramosa canescente ramulis compressis, florum glomerulis sessilibus, calycibus ovato-campanulatis minute pubescentibus 4–5-dentatis, petalis 4–5, staminibus fertilibus 5–6.—Folia 9–11-pollicaria, rigidule chartacea v. subcoriacea, 2½ poll. lata, sæpius inæquilatera. Stipulæ latiusculæ, diu persistentes. Paniculæ ex axillis foliorum delapsorum semipedales ad pedales. Bracteæ oblongæ, concavæ, summæ minutæ, inferiores geminæ, stipulæformes. Flores 1½ lin. longi. Filamenta basi connata et dense villosa. Antheræ 2–3 perfectæ, 3–2 minores, globosæ, cassæ.—A tall tree, with spreading branches, from Caripi, on the Rio Parà.

The *Terminalia*, distributed as *T. Paraensis*, Mart., was a lofty tree, throwing out buttresses at the base; there were, also, a few specimens of a new species. It is difficult, it is true, to determine *Terminaliæ* with any certainty without the fruit, but this one is evidently distinct from all the smooth narrow-leaved species known to me by the calyxes, which are as hairy outside as inside. The limb of the calyx is, also, smaller than usual in proportion to the ovary, and the latter is not contracted at the apex. I have, therefore, ventured to characterize it as follows:—

Terminalia *eriantha*, foliis oblongis acutiusculis basi longe angustatis, novellis ramulisque pilosis demum glabratis, spicis elongatis laxis, ovario ferrugineo-tomentoso apice post anthesin truncato, calycibus utrinque dense villosis.—Arbor ramis teretibus. Gemmæ floriferæ ramentis fusco- v. ferrugineo-tomentosis obtectæ, spicas emittunt plures, 3–4-pollicares, jam infra medium interrupte floriferas, simulque ramulum floriferum brevem angulatum et pilosum. Folia tempore anthesis haud perfecte evoluta, pleraque 2–3 poll. longa,

½–1 poll. lata, ex oblongo-lanceolata in obovatam formam abeuntia, in petiolum 3–4-linearem contracta, supra siccitate fusca et pilis conspersa, subtus pallidiora, crebre reticulata, glabra v. ad costas pilosula. Bracteæ setaceæ, ovarium subæquantes, dense ferrugineo-pilosæ, acumine subulato glabro terminatæ. Calycis limbus ovario paulo longior, usque ad medium divisus in lobos 5 late triangulares. Stylus basi incrassatus, pilosus, apice glaber, acutus. Filamenta glabra v. basi pilosula. Ovula 2.—Caripi, on the Rio Parà.

There are twelve *Melastomaceæ*, chiefly well known; one, however, is a fine new *Miconia*, forming a tree of about thirty feet in height, from Tanaü, on the Rio Acarà, thus characterized:—

Miconia (Eriosphæria) *dispar*, ramulis subtetragonis ferrugineo-tomentosis, foliis petiolatis amplis ovali-ellipticis breviter cuspidatis subdenticulatis basi acutis supra glabris subtus ferrugineo-tomentosis præter nervum marginalem trinervibus, panicula pyramidata, floribus in ramulos ultimos seriatis, calycis tomentosi dentibus brevissimis.—Folia maxima 1–1½-pedalia, 6 poll. lata, sed cujusve paris sæpius valde inæqualia, omnia apice rotundata, cuspide brevi acuta terminata, margine plus minus denticulata, basi longiuscule angustata, petiolo crasso angulato circiter pollicari; tomentum paginæ inferioris stellatum. Panicula supra folia ultima breviter pedunculata, foliis brevior et ramulo excrescente mox lateralis, tota ferrugineo-tomentosa; rami oppositi, inferiores trifidi ramulis bifidis, intermedii 2–3-fidi, summi simplices. Bracteolæ ovatæ, caducissimæ. Flores secus ramulos ultimos sessiles. Calyx ovoideus, dense tomentosus. Petala parva, orbiculata, unguiculata, pallide rosea. Antherarum connectivum basi biauriculatum. Ovarium semiadhærens; vertice glabrum, 4-loculare, ovulis haud numerosis (in quoque loculo 6–8). Fructus globosus, tomentosus, fere 2 lin. diametro.

The *Myrtaceæ* comprehend the *Myrtus Gœtheana*, Mart., retained in that genus by De Candolle on account of the structure of the seeds, although it differs considerably in habit from the generality of true *Myrti*, and three or four *Myrciæ* or *Eugeniæ*, very difficult to determine without working up the almost innumerable Brazilian species of those two genera. There were no dried specimens sent of any of the *Lecythideæ* mentioned in the Kew list.

The two following *Anguriæ* were not in sufficient number for distribution.—

Anguria *sinuata*, sp. n., glabra v. præsertim ad petiolos pilosa, foliis cordato-ovatis sinuato-lobatis integrisque scabris, spicis masculis longe pedunculatis globoso-capitatis, floribus numerosis pedicellatis calycis tubo ovato villoso.—Planta alte scandens, ramulis angulatis, junioribus ad angulos pilosis, adultis glabris lævibus. Folia semipedalia, basi late cordata, auriculis rotundatis, apice obtusa, margine obscure v. profundius sinuato-triloba, utrinque viridia et scabra, basi trinervia, nervis lateralibus bipartitis; petiolus pilosus, 1–1½-pollicaris. Pedunculus semipedalis. Capitulum 1½ poll. diametro; flores rubri, dense conferti, mediantibus pedicellis 2-linearibus receptaculo carnoso ovoideo affixi. Calycis tubus 4–5 lin. longus, ovoideus, superne constrictus; limbi laciniæ 4 v. rarius 5, 2–3 lin. longæ, lineari-lanceolatæ, acutæ. Petala linearia, laciniis calycinis dimidio breviora. Antheræ anguste lineares, subsessiles.—A very distinct species, of which, however, there was but a single male specimen from the neighbourhood of Parà.

Anguria *cissoides*, sp. n., caule glabro, foliis trisectis, segmentis petiolulatis ovatis cuspidatis spinuloso-dentatis hirtellis, lateralibus dimidiatis, pedunculis elongatis breviter racemosis, floribus paucis glabris v. pilosis, petalis calycis laciniis dimidio brevioribus.

A climber of twenty feet, growing in bushy places near Parà. It agrees in almost everything with Pœppig's description of his *A. bignoniacea*, but the leaves are sprinkled all over with scattered hairs, and the petals are much shorter, not longer than the calycine lobes. There were but very few male specimens, and a single female one with imperfect flowers. The inflorescence was the same as in the males, but the flowers appeared to have been more numerous and smaller.

There are three *Visca*, the determination of which we have been compelled to postpone. Among the *Rubiaceæ* are fine specimens of a plant distributed under the name of *Faramea vaginata*, which I had referred to that genus on account of its close affinity to the *Faramea glandulosa* of Pœppig. Since then, however, having had occasion carefully to examine all the species of *Faramea* I could procure, I have been obliged to exclude both these species, as well as one or two others, which all agree in the imbricately æstivated corolla with *Ixora*, but have the ovules erect from the base of the two cells of the ovary, as in *Psychotria* and *Palicourea*, thus showing that they belong to some genus distinct from all that are well known; but as I have not

seen the fruit of any of them, I am not yet certain that they may not be referable to some one of the imperfectly described genera already established; I therefore reserve their description for a future opportunity.

The *Compositæ*, chiefly in single specimens, afford no species of much interest. The same may be said of the greater number of the *Monopetalæ*, which are either well-known herbaceous coast-plants, or, even when less common, belong to Natural Orders so lately worked up for the *Prodromus*, as not to call for observation. Among them, however, is the *Masseranduba*, or Milk-tree, n. 21 of the Kew list (p. 74). It was not found in flower or fruit, but from the leaves there is little doubt of its being a Sapotaceous plant, and probably some species of *Sapota*. There are several specimens of *Voyria uniflora*, found growing among dead leaves, but Mr. Spruce failed in discovering any traces of parasitism. Three fine plants, not common in collections, *Potalia resinifera*, Mart., *Adenocalymna magnifica*, Mart., and *Prevostia amazonica*, Chois., are unfortunately in single specimens only.

Among the *Euphorbiaceæ* are three interesting species: the *Caoutchouc*-tree, or *Seringuera* of the Brazilians, n. 18 of the Kew list (p. 73), is not the Guiana kind (*Siphonia elastica*, Pers.), but a distinct species, *S. brasiliensis*, Willd., described by Kunth in Humboldt's 'Nova Genera et Species,' vol. vii. p. 130. The *Tacuari*, n. 22 of the Kew list (p. 74), is a *Mabea*, also distinct from the two species described by Aublet; it agrees, however, with the one described by Martius under the name of *M. fistulifera*, and all three appear to be known by the name of *Tacuari*, and to supply the slender branches used by the natives for tobacco-pipes. The following is new:—

Peridium *oblongifolium*, foliis petiolatis oblongis obtusis basi angustatis supra glabris nitidis subtus ramulisque lepidotis, involucris masculis globosis ferrugineis.—Ramuli juniores ferrugineo-lepidoti, rami vetustiores cinereo-albidi. Folia 3–4 poll. longa, 1–1¼ poll. lata, consistentia laurina, petiolo lepidoto 4–5 lin. longo. Pedunculi brevissimi, pedicellis 2 lin. longis. Involucra mascula iis *P. ferruginei* breviora, exacte globosa nec ovoidea. Bracteæ exteriores brevissimæ, latæ, obtusissimæ. Stamina circa 10, filamentis brevibus subtriadelphis, et interdum squamulis brevibus interstincta. Ovaria nunc nulla, nunc rudimentaria, tenuia, et interdum squamula membranacea lanceolata fimbriata stipata. Flores fœmineos non vidi.

A small bushy tree, found growing on the beach of the Rio Parà, near Caripi. It is closely allied to *P. ferrugineum* of Schott, from Southern Brazil, but, on a careful comparison with my specimens of that plant gathered by Sello, ours appears to differ both in the shape of the leaf, longer in proportion to its breath, and in the small size and round shape of the flower-heads.

The *Monocotyledones* are, for the most part, well-known species, although some of them are not common. They include twenty-four *Cyperaceæ* and twenty-two *Gramineæ*. Among the former is a specimen, not in flower, which very much resembles the *Cyperus articulatus*, L., of which, Mr. Spruce informs us, the tuberous root is sweet-scented, and is used as a perfume; and an *Eleocharis*, of the section *Chætocyperus*, which has been distributed as new, under the name of *E. arenaria*. A further examination, however, induces me to suspect it may be a mere variety of *Chætocyperus bonariensis*, N. ab E., differing in the number of setæ, six instead of three, and the more distinctly granulate achenia. It forms large patches on the beach at Caripi, and serves to bind the sand.

The *Soridium Spruceanum*, Miers, a new genus, and by far the most interesting plant of the collection, is fully described by Mr. Miers in a paper read before the Linnæan Society, and about to appear in the Transactions of that body.

Extracts from the private Letters of Dr. J. D. Hooker, *written during a Botanical Mission to* India.

DARJEELING TO THE BORDERS OF BHOTAN.

(*Continued from p.* 218.)

On the opposite bank we were delayed some hours, waiting for a guide, whom we expected to follow us. Four roads meet here, or rather forest-paths, and all are difficult to find. Being now in Sikkim, and beyond the British ground, any one guiding Europeans is liable to punishment; and though the road we sought is so unfrequented that there is no chance of obstruction, the others, which might be inadvertently taken, are more populous. Ours, of course, lay down the river, whose banks were far too rugged, here, to be pursued. A marriage procession soon came up, or rather the bridegroom-half of the party, a handsome young Lepcha, leading a cow for the marriage feast. After talking to him a little, he volunteered to show us the path, which led through a thick forest, along the steep hill-side: it soon descended to a narrow belt of dense jungle, with a weak *Equisetum*, five feet high, climbing among rank *Grasses*, small *Palms*, &c.

On the rocky dry eminences *Pinus longifolia* grew, and on the flats the beautiful *Cycas pectinata*, with a stem about ten feet high, and a tuft of foliage like that of *C. revoluta*. Many *Scitamineæ*, but especially *Curcuma*, were springing up, and the character of the vegetation was altogether that of the Terai.

The contrast of the tropical *Cycas* and Scotch-looking *Pine* was most wonderful. Much of the forest had been burnt, and we traversed great blackened patches, where the heat was terrific, and increased by the prostrate and still-burning trunks of great trees, which smoulder for months, and leave a heap of white ashes. The larger timber, being hollow in the centre, a current of air is produced, that eats away all the circumference, the sides fall in over the burning centre, and all is consumed. You are often startled, when walking in the forest, by the hot blast proceeding from such trunks, which are approached without suspicion of their being other than cold dead trunks.

Leaving the forest, the path runs along the river-bank, and over the great masses of rock which strew its course. Skipping from stone to stone, in these close valleys, carrying an umbrella and stick, is very toilsome work. There is much mica in the sand between the rocks, and much of the sand is red—disintegrated jasper, probably, or quartz tinged with oxide of iron, exactly similar to what I met with on the banks of the Ganges. The stunted *Ficus* and *Croton* are the common plants of the rocky water-side, with a creeping *Polypodium*, *Cyperus*, *Kyllingia*, *Carex*, *Panicum*, *Sida*, &c. *Fici* are the prevailing trees: some are very handsome, especially the *F. elastica*, whose foliage is eminently beautiful. *Bassia butyracea*? also occurs—the *Yel Pate* of the Lepchas, from the seeds of which they express a concrete oil, which is received and hardens in bamboo vessels. On the forest-skirts, *Hoya*, parasitical *Orchideæ* and *Ferns*, *Hiræa*, *Hiptage*, *Bauhinia*, and a shrubby

Polygala abound, with *Banana*, and the usual larger trees. A fine *Citrus* also occurs, some *Sapindaceæ* and *Verbenaceæ*, as *Premna*, *Clerodendron*, *Volkameria*, and *Callicarpa*; shrubby *Acanthaceæ*, *Menispermeæ*, *Vitis*, &c. Large fish are abundant in the beautifully clear water of the river. But by far the most striking feature consists in the amazing quantity of superb butterflies, those beautiful tropical swallow-tails, black with scarlet or yellow eyes of great size, *Nymphalideæ*, and, indeed, of almost all Orders but *Coliadeæ*, which appear scarce. They flutter everywhere, or sail majestically through the still hot air, skipping from one scorching rock to another, and especially loving to settle on the damp sand of the river-edge. There they sit by thousands, with erect wings, and, balancing themselves with a rocking motion, as their heavy sails incline them to one side or the other, they resembled a crowded fleet of yachts on a calm day. Such an entomological display cannot be surpassed. *Cicindelæ* were very numerous, and incredibly active, so were *Grylli*; and the great *Cicadeæ* were everywhere lighting on the ground, where they utter a short sharp creaking sound, and anon disappear, as if by magic. Of birds I saw none. A few exquisitely beautiful whip-snakes were gleaming in the sun: they hold on by a few coils of the tail round a twig, the greater part of their body stretched out horizontally, occasionally retracting, and darting with unerring aim at some insect in the air or on the twig. I caught one by cautiously approaching with a long bamboo. All the rocks *in situ* along the river-bank are very hard, of gneiss, passing into clay-slate, dipping like those at Darjeeling at various angles. The boulders in the bed were chiefly of similar rocks, but often of mica-schist, with garnets, and of gneiss, traversed by quartz veins, in various directions. I picked up a good many pieces of trap: some were very ponderous and ferrugineous. A large water-worn lump of plumbago was found by one of the men,—no limestone was to be seen. The narrowness of the gorge, and excessive steepness of the bounding hills, prevented any view, except of the opposite mountain face, which is one dense forest, conspicuous, as usual, for the *Banana*.

Towards evening we arrived at another cane-bridge, still more dilapidated than the former, but quite similar in structure. For a few hundred yards before reaching it, the path led along the precipitous face of slate-rocks overhanging the stream, which dashed with great violence at its foot. Though we could not proceed comfortably, even with our shoes off, the Lepchas, bearing their enormous loads, walked along, like flies on a wall, with perfect indifference. Several *Lichens* grew on these rocks: one is a curious *Umbilicaria*, or *Endocarpon*.

Anxious to avoid sleeping at the bottom of the valley, we sought a place above whereon to pitch the tent, but only one very steep hill was accessible, up which we crawled, very much fatigued, for a few hundred feet, through burnt dry forest. A very sharp ridge was our only reward, so narrow that the tent sate astride on it, the ropes being fastened to the tops of small trees, on either slope. The ground swarmed with black ants, which got into our tea, sugar, &c., and was so covered with charcoal, that we were soon begrimed. *Phœnix*-stumps were scattered everywhere around. The trees consisted chiefly of *Shorea* (Sal), and *Terminalia*, or *Pentaptera*. Our Lepchas preferred remaining on the river-bank, whence they had to bring up water, in great bamboo "chungis," as they are called.

On the following morning I ascended the ridge for 1,000 feet, but I saw nothing, except scorched forest, covering ridges which descended from the great mountains, and were all as hog-backed as that on which we camped. The great dryness of this face is owing to its southern exposure: the opposite mountains, equally high and as steep, were clothed in a rich green forest.

At nine, A. M., the temperature was 78°, but a fine easterly wind reduced it, to the feeling, full ten degrees. Descending to the bed of the river, the temperature was 84°. The difference in humidity of the two stations (about 300 feet difference of height) was more remarkable: at the upper, the wet-bulb thermometer was 67·5°, and consequently saturation point 0·713. At the lower, the wet-bulb 68°, and saturation 0·599. The temperature of the river was, at all hours of the preceding day, and this morning, 67·5°; its breadth forty or fifty yards, and current very rapid, amongst immense boulders of gneiss; the colour a lurid deep green, but very transparent. A westerly light wind blew over the channel, no doubt induced by the easterly direction of the rapid current; for, at 300 feet above, the wind was easterly, and the clouds still moved to the west. At this hour, the probable temperature at Darjeeling (6,000 feet above this) is 56°, with a temperature of wet-bulb 7·50°, giving a very much damper atmosphere = 0·816.

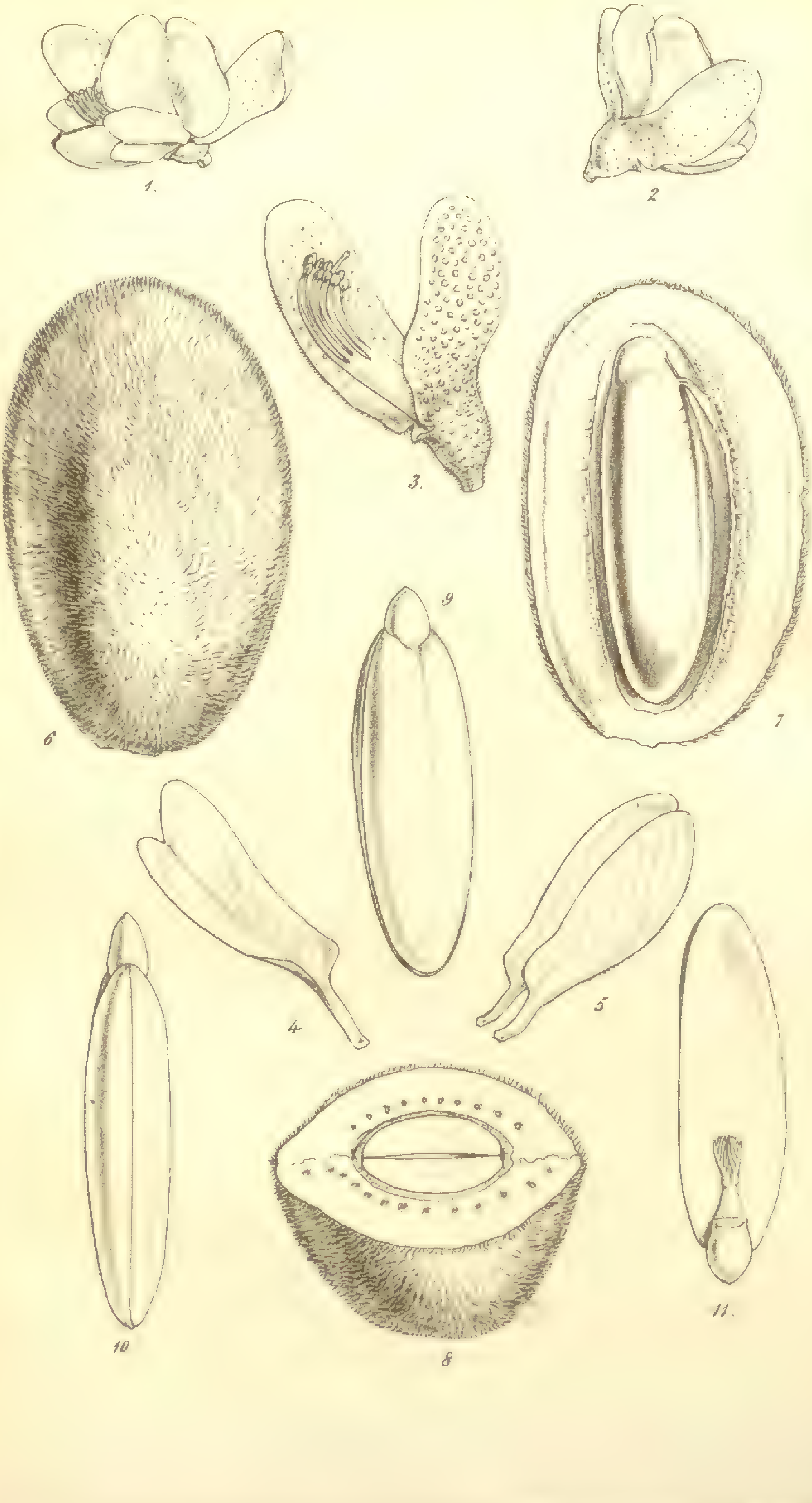
At Calcutta, again, temperature is 91·3°, wet-bulb, 81·8°, and saturation = 0·737. The dryness of the air, in the *damper*-looking and luxuriant river-bed, is owing to the heated rocks of its channel; while the humidity of the atmosphere over the drier-looking hill where we encamped, is due to the moist easterly wind then blowing.

Our course lay over a still more rugged country than yesterday, though altogether similar in other respects. Giddy and foot-sore with leaping from rock to stone, we attempted the jungle, which proved utterly impervious. Some masses of gneiss, washed down the river, were curious, from being full of compressed nodules of quartz, of excessive hardness, and a foot or so long.

On turning a bend of the river, the mountains of Bhotan suddenly presented themselves, abruptly crossing the river's course, with the Teesta flowing at their base; clambering round a precipice of slate-rocks, we emerged at the angle formed by their junction. It was simply the meeting of three defiles,—that of the Rungeet, which we had followed from the west, of the Teesta, coming from the north, and of their united streams, flowing south. The natural features of all were the same—rugged watercourses, rushing in very deep channels, bounded by mountains, forest-clad at the base, and so lofty and steep that their tops were shut out from view.

We were not long before enjoying the water, when I was surprised to find that of the Teesta singularly cold, and the thermometer proved it to be full seven degrees colder than the Rungeet. At the salient angle (a rocky peninsula) of their junction, you may almost place one foot in the cold stream, and the other in the warmer. This is, no doubt, due to the Teesta flowing south, and thus having less of the sun, and partly to its draining snowy hills, during a much longer part of its course. The temperature of one was 67·5°, of the other 60·5°.

There is a no less notable difference in the colour of the two rivers, the Teesta being sea-green and muddy, the Great Rungeet dark-green and very clear. They meet at an angle, and the waters preserve their colour for some hundred yards, the line separating the two being most distinctly drawn. The Teesta, or main stream, is much the broadest (about eighty or a hundred yards wide at this season), the most rapid, and deepest. The rocks which skirt its bank are covered with a mud deposit, which I nowhere observed along the Great Rungeet, and which shows a remarkable difference between the two rivers, and is owing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Fitch del et lith.

R B & R imp

Eboe Nut.
(Dipteryx oleifera)

to the greater volume and rapidity of the Teesta, combined probably with its having a shorter course. There can be little difference in the nature of the rock or soil over which they flow.

Some considerable banks of sand lay about, much above the mean water-level, deposited by the floods. They contained a large proportion of the rose-coloured sand, which I presume to be the detritus of rocks on the higher ranges to the north; for I see no rock likely to produce it amongst these hills.

At eleven A. M. of the 6th, the temperature was 86°; at noon 90·5°, in the forest, and in the coolest shade, by a rill of water, 89·5°; that of the rill being 72·5°. The black-bulb thermometer stood at 123° at eleven A. M., and 140° at noon; the sand was heated to 126° and 142° at those hours. These temperatures are by no means very high, but, owing to the closeness of the valleys, the heat approached at times to suffocation. Its effect is most sensibly felt at ten till noon, by which time so much vapour is raised, as to obscure the sun's direct rays.

We followed the same route on our return, and, except finding a good many small trees of *Ficus elastica*, I have little to add.

(To be continued.)

BOTANICAL INFORMATION.

EBOE NUT *of the Mosquito Shore.*

(TAB. VII.)

One species of *Dipteryx*, namely *D. odorata*, Willd., is an object of commerce in its seeds, on account of their fragrance, under the name of *Tonka* or *Tonquin Bean*: they yield a volatile oil, used largely by the perfumers and makers of snuff, and which has been ascertained to contain a peculiar principle called *Coumarine* by the French chemists, *Stearoptène* (Dr. Ure). "The oil is extracted by digestion with alcohol, which dissolves the stearoptène, and leaves a fat oil." It has a powerful and agreeable odour, as is familiar to most people. Commonly a seed, or "bean," is put into a box, which yields its fragrance to the snuff and lasts for years.

Another species of *Dipteryx* of the Mosquito shore affords a similar fatty oil, which has long been in vogue with the natives of the Mosquito shore for anointing the hair, and is now used for the like purpose, and sold in the shops in England; in one case with the name of "Perry and Co.'s *Medicated Balm*, under the patronage of the Royal Family." Our Museum of the Kew Gardens possesses the fruit and seeds of this plant, obligingly sent by W. D. Christie, Esq., from the Mosquito country; and Miss Daniell, of Parson's Green, Fulham, possesses dried flowers of the same plant: from these our figures have been taken, and these have sufficed to enable Mr. Bentham to determine that it is a new species of the genus, *D. oleifera*, Benth.; one of eight now known to that gentleman, and mentioned at p. 235 of the present volume. With such materials our friend has not ventured to form a specific character. The distinctions at present known consist in the very large glandular dots on the calyx, the very great size of the two calycine segments, and the inodorous seeds. These characters we shall provisionally adopt, and we doubt not that this imperfect account of a useful plant will be a means of eliciting further information and procuring more perfect specimens than we yet possess.

Dipteryx *oleifera*; calycis lobis duobus maximis grosse copiose resinoso-punctatis, seminibus inodoratis.

D. oleifera, *Benth. in Hook. Kew Gard. Misc.*, *supra*, *p.* 235.

HAB. Mosquito shore. "Eboe-tree" of the natives.

TAB. VII. *Fig.* 1, 2. Flower, *nat. size*; fig. 3, large lobes of the calyx; fig. 4, carina, and fig. 5, alæ of the corolla, *magnified*; fig. 6, fruit; fig. 7, the same laid open, showing the insertion of the seed; fig. 8, transverse section of ditto; figs. 9, 10, embryo; fig. 11, embryo, with one cotyledon removed, showing the plumule and radicle:—*nat. size.*

CHINESE "RICE-PAPER."

(TAB. VIII., IX.)

We are not *yet* prepared to state what is the plant which yields the beautiful and now well-known substance called *Rice-paper*; but, thanks to the queries inserted from time to time in our 'Journal of Botany,' and to the exertions made by our numerous friends to contribute to the *Museum of Economic Botany*, now so successfully forming at the Royal Gardens of Kew, we have advanced more than one step towards such a knowledge. In a late number (p. 27 of the present volume) we were enabled to give some interesting information relative to the "*Rice-paper*," through the

Tab. VIII

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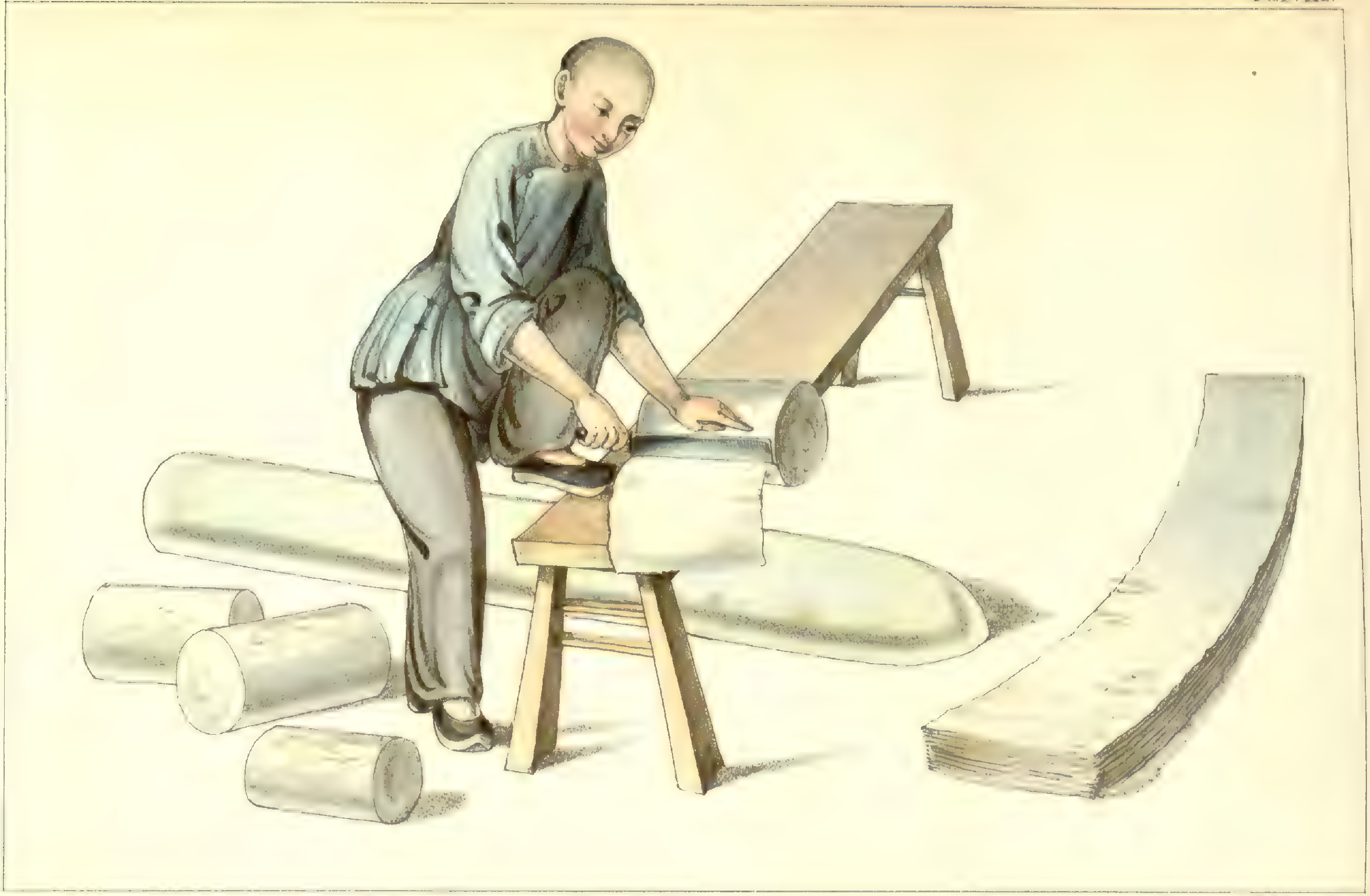
P. Reeve, imp.

Rice Paper-plant
(from a Chinese drawing.)



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F Reeve, imp.

Mode of cutting Rice Paper.
(from a Chinese drawing.)

kindness of Mr. Layton, H.B.M. Consul at Amoy, and we have now the pleasure of communicating some further intelligence, derived from C. J. Braine, Esq., a gentleman who has recently returned from Hong-Kong, bringing a rich collection of living plants for the Royal Gardens of Kew, and many curious vegetable products for the Museum of the same establishment,—together with a thin volume of well-executed drawings by a Chinese artist, on *Rice-paper*,—said drawings exhibiting the several states or conditions of the Rice-paper plant, from the preparation of the seed to the packing of the material for exportation.

We have selected two out of the eleven of these drawings for our Journal, as illustrative, in the one case, of the growing plant, and in the other, of the mode of cutting out, or forming, the sheets of this paper. The first of these (Tab. VIII.) does, indeed, exhibit the growing plant as of so strange a character, that no botanist to whom we have shown it can conjecture to what family it may belong; and one is naturally led to inquire how far the correctness is to be depended upon; more especially as the representation is quite at variance with a Chinese figure, said to be that of the Rice-paper plant, in the possession of J. Reeves, Esq., of Clapham, alluded to at p. 29, *supra*. We should, however, be disposed to think more favourably of the correctness of a *series* of drawings made expressly for the purpose of illustrating the History of the "*Rice-paper*," than of a solitary and isolated figure expressly required to be made by a European. In this latter case "John Chinaman" is, perhaps, not wholly to be trusted.

We cannot do better in this place than describe the figures given in the book in question, sure as we are that such a notice will call the attention of our friends in China to this subject, and especially of those who have the means of communicating with the Island of Formosa, where *alone* (some say) the plant is found, "in the swampy grounds, province of *Sam-swi*, at the northern part of that little-known island." We may here observe, in favour of the fidelity of representation of the plant, that the figures and accompaniments are well executed, and with every appearance of accuracy, and that the same form and relative size of the plant runs through the several representations.

Drawing No. 1. This and the two following drawings in the volume assure us of the fact that the Rice-paper plant is an object of *cultivation*. Here a Chinaman is represented with two baskets, one filled with the seed; and he is engaged in separating the good from the bad by hand.

No. 2 represents a well and a bucket, and utensils for washing the seed, and thus making a more perfect selection for sowing. A man is pouring the washed seed into a basket.

No. 3 shows a man, with the basket of seed, in a field prepared with holes, into which he drops the seeds, three at a time.

No. 3. (See Tab. VIII.) Here we have a cluster of the plant itself, rising above the roof of a small shed or summer-house. A figure is seen by the side of them, who evidently appears interested about them: or he may be placed there to enable one the better to judge of the size of the plant, by a comparison with the human figure. The lower part of the plants is concealed by the roof of the building; but enough is seen to show that they are something quite new to us;—though more, perhaps, like gigantic "heads" of Asparagus than anything else to which we can compare them, but too much split at the top into branches? or leaves?

No. 4. In this a man seems to be in the act of pulling entire plants, which, though gathered and lying on the ground, exhibit no appearance of roots; but a conical even base, as if cut off conically above the root.

No. 5. Here the three plants selected, as just mentioned, are tied in a bundle, slung upon a bamboo pole, and carried on the shoulders of two men to a pond of water, into which they are evidently to be plunged, as it would appear for the purpose of separating the external coat or bark. The same general form here prevails as in the two preceding figures: but one of the stems has a few fibres on the conical base, like those of some *Palm* or other monocotyledonous plant. The fact of two men being required to carry three stems would imply their bulkiness.

No. 6. Whether or not the present figure is out of place we cannot say: but it represents a Chinaman sitting on the ground, and with five stems (the heads and feet, or tops and bottoms, having been removed), which are whiter and smaller than those of previous figures, as if peeled; and the man is engaged in shaving still more from the outside of one with a cutting instrument, and the chips strew the ground.

No. 7. It would appear that this drawing should immediately follow No. 5, for it exhibits a man seated on a stool and peeling the outer coat or rind (the crown being cut off), much in the same way as a *Banana* is peeled by beginning at one end and stripping off the green rind in riband-like pieces, which he lays upon the stool; and when one is completed, he puts it aside, a cylinder of pith of exquisite whiteness.

No. 8. (Tab. IX.) Here we see an entire stem or cylinder of pith, and one cut into truncheons a foot or more in length. One of these a man lays upon a stool, and, with a long-bladed knife, inserted a little way into the surface longitudinally, he turns the truncheon round and round, till a sheet, probably two feet or more in length, is, as it were, spirally cut through, in the same way as thin sheets or plates of ivory are cut from the tusk of an elephant. These sheets our Chinaman lays one upon top of the other, on the ground.

No. 9. A man is laying out the sheets in low piles on a large table.

No. 10. A man is engaged in placing the "*Rice-paper*" in bales, and cording them.

No. 11, the last drawing, shows the last process: viz., packing the sheets in a chest for exportation.

We may observe that the drawings are of good execution, the countenances of the men well and even beautifully done. The perspective, as usual with the Chinese, is far from good, and, were we to judge from the largest specimens we have received of the cylinders of pith, and the largest of the sheets in our Museum, the diameter of the *stems* is represented much too bulky in proportion to the size of the human figures. Our stems (deprived of the outer coat, or all but the pith), do not exceed the size of three fingers' breadth in diameter: so that but for the drawing at No. 5, showing two men engaged in the carrying three stems, we should be disposed to think the cylinders and stems in the drawings (shown in our two figures) exaggerated. We trust, however, our friends in China, especially at Amoy, will not allow us long to remain in ignorance of the veritable *Rice-paper plant*.

HERBARIUM OF M. BARNEOUD.

Dr. Marius Barnéoud, author of a monography of *Plantagineæ*, and of other works, is desirous of parting with his herbarium, which consists of 6,000 species, of chosen specimens, and in the best preservation, carefully arranged, according to the natural families, in pasteboard cases. This herbarium represents nearly completely the Flora of continental France, amongst which are the types of the Provençal floras of Perreymond and Robert, and contains a fine collection of Corsican, Algerian, and Mediterranean floras. Letters may be addressed in French, English, or Latin, to M. Marius Barnéoud, Docteur ès Sciences, Place Poissonnerie, à Toulon.

Notes on CLEOMELLA ; *by* DR. TORREY.

(From Memoirs of the American Academy of Arts and Sciences, N. S. vol. iv. p. 11.)

This genus was founded by De Candolle, on an unpublished drawing of a Mexican plant, of which specimens seem to be almost unknown in European herbaria. The description of De Candolle is brief and unsatisfactory. It was with doubt that I referred to his *Cleomella Mexicana* a plant found in Western Arkansas by Dr. James, in Long's first expedition. The latter plant was afterwards detected by Mr. Drummond, in Texas, and by Mr. Beyrich, on the Upper Platte. It was described and figured by Sir William Hooker, in the first volume of his 'Icones,' as *C. Mexicana*, and described under the same name in the 'Flora of North America,' as well as in the recent 'Genera Illustrata' of Dr. Gray. Another species of the genus was discovered by Colonel Fremont, in California, and published in his second report. About three years ago I received from Dr. Halsted excellent specimens of a *Cleomella*, which he collected on the march of our army from Vera Cruz to the city of Mexico. This is probably the original species of De Candolle, as it seems to be exclusively Mexican, while the *Cleomella* of Texas and Arkansas has not been found beyond those States, except in their immediate borders. I have, therefore, changed the name of the latter plant. A fourth species of the genus was discovered by Dr. Gregg, in Chihuahua and San Luis Potosi, in 1847 and 1848. The following synopsis will exhibit the leading characters of all the species.

1. Cleomella *Mexicana* (DC.); foliolis spathulato-obovatis obtusis vel retusis glabris; bracteis plerumque trifoliolatis; ovario stylum brevissimum multoties superante stipitem subæquante; capsula retusa subbicorni stipitem superante; seminibus lævibus.—*C. Mexicana*, DC. Prodr. vol. i. p. 237; D. Don, in Edinb. New Phil. Journ., Jan. 1831.—Mexico, *Moçino et Sesse*, ex *De Candolle*. Between Vera Cruz and the city of Mexico, *Dr. Halsted.*

This species is about a foot high, much branched, and apparently diffuse. The leaflets are about one-third of an inch long, quite glabrous, somewhat fleshy, and mucronate with a short bristle. The petiole is about as long as the leaflets. Stipules minute, subulate and entire. The golden-yellow flowers are in terminal racemes, which are finally much elongated. Petals about three times the length of the sepals. Pod 6–8-seeded, almost two-horned by the projecting upper angles of the valves, the breadth (about 3½ lines) nearly twice as great as the length. Fructiferous pedicels 4–5 lines long.

2. C. *longipes* (sp. nov.); foliolis spathulato-obovatis obtusis vel retusis integerrimis vel margine serrulato-scabris; bracteis superioribus simplicibus; ovario stylum bis superante stipite pluries breviore; capsula retusa subbicorni stipite subduplo breviore.—Valley near San Pablo, Chihuahua, and near San Francisco, San Luis Potosi, Mexico, *Dr. Gregg.* Collected in flower only, April 29th, and in both flower and fruit, Dec. 28th.

Differs from the preceding in the considerably larger and less conspicuously mucronate leaves, the remarkably long stipe, and the conspicuous style; while the upper bracts seem to be uniformly simple. Seeds the same as in *C. Mexicana.*

3. C. *obtusifolia* (Torr. et Frem.); foliolis cuneato-obovatis obtusissimis integerrimis supra glabris subtus pubescentibus; bracteis unifoliolatis; sepalis lacerato-3–5-dentatis; ovario stipite 4–5-ties breviore stylo bis breviore; capsula . . . —Torr. et Frem. in Frem. Second Report, p. 311. — On the American Fork of the Sacramento River, California; flowering in March, *Colonel Fremont.*

My only specimen of this species is that of an annual, about a span high, but doubtless much larger when mature. The stem is branched from the base, and glabrous. The leaflets are about half an inch long, and are tipped with a deciduous bristle. Stipules laciniately fimbriate. Calyx much shorter than the corolla. Petals yellow, oblong-lanceolate. Stipe much exserted. Ovary obovate, with apparently but few (about 6) ovules. Capsule unknown.

4. C. *angustifolia*; foliolis oblongo-linearibus acutiusculis integerrimis; bracteis superioribus simplicibus; ovario stylum multoties superante stipite bis terve breviore; capsula dilatato-rhomboidea acuta; seminibus transverse rugulosis.—*C. Mexicana*, Torr. in Ann. Lyc. Nat. Hist. New York, vol. ii. p. 167; Hook. Ic. vol. i. t. 28; Torr. et Gr. Fl. N. Am. vol. i. p. 121; Gray, Gen. Ill. vol. i. p. 174, t. 75, and Pl. Lindh. no. 10 (in Bost. Journ. Nat. Hist. vol. v. 1845), non DC.—Western Arkansas, *Dr. James.* On the Upper Platte, *Mr. Beyrich.* San Felipe, Texas, *Drummond.* High prairies west of Houston, *Lindheimer.*

NOTICES OF BOOKS.

New Edition of the BRITISH FLORA.

A new (the sixth) edition of the BRITISH FLORA, by Sir W. J. Hooker and Dr. Arnott, has just been printed by Messrs. Longmans. The whole work has undergone a careful revision by the Authors, so as to render the volume as perfect as the present state of our knowledge of the Plants (Phænogamic and Ferns) of the British Islands will allow. To render it more portable, the present edition is of a 12mo size; the plates are entirely re-executed, and in the most beautiful manner, by Mr. Fitch.

THE TOURIST'S FLORA; *by* JOSEPH WOODS, F.A.S., F.L.S., F.G.S. London: Reeve and Benham. 8vo. 1850.

Few books were more required for the use of the many English travellers who make the ordinary European tours, in their own country or on the Continent, and who desire an acquaintance with the many vegetable productions they see around them, than one like the present; and few men are more competent to prepare such a work than Mr. Joseph Woods, a very considerable portion of whose long life has been devoted to travelling at home and abroad, with this special object in view. He is himself familiar with most of the plants described in this volume, from having studied them in their native localities, and he has taken great pains to give the essential characters of the genera and species in as few words as possible: so that the whole is comprised in five hundred closely printed pages, in double columns. The countries embraced are the *British Islands, France, Germany, Switzerland, Italy*, and the *Italian Islands.* These limits are chosen as those of the countries most frequented by English tourists. The arrangement in the body of the work is according to the Natural Orders, but the key to the genera is on the Linnæan system, with references under each genus to the page where the species will be found. This plan is, probably, well suited to the wants of the majority of those for whose use it is especially intended, and we are sure that to such Mr. Woods has rendered a most acceptable service. Partial or local Floras are not wanting, but generally written in the Latin tongue. This is the first attempt to embrace several countries commonly included in what is called a "Continental Tour," and we heartily wish the publication the success it so justly merits. It is accompanied by a full index of genera, species, and synonyms.

Contributions to the Botany of WESTERN INDIA;

by N. A. DALZELL, Esq., M.A.

(*Continued from p.* 145.)

Nat. Ord. RUBIACEÆ.

Tribe EUGARDENIEÆ.

DISCOSPERMUM. Genus novum.

Calyx parvus, tubo turbinato brevi cum ovario connato, limbo profunde 4-lobo, lobis rotundatis. *Corolla* breviter hypocrateriformis, *tubo* cylindrico, *fauce* pubescente, *limbi* lobis 4 obtusis *æstivatione* imbricatis sub anthesi revolutis tubum æquantibus. *Stamina* 4, fauce corollæ inserta, exserta, *filamentis* brevissimis. *Ovarium* inferum, biloculare; *ovula* in loculis 4–5. *Stylus* brevis, crassiusculus, ad medium bifidus, ramis divaricatis acuminatis. *Fructus* globosus vel obovatus, lævis, coriaceus, indehiscens, apice calycis limbo coronatus, umbilicatus, vel infra apicem calycis basi circulari coronatus. *Semina* in placentis linearibus dissepimento utrinque adnatis inserta, compresso-lenticularia, verticalia, septulis membranaceis vel arillis lamellatis verticalibus distincta. *Embryo* in albuminis cartilaginei axi rectus, radicula cylindrica infera. *Testa* fibrosa.—Arbores *mediocres*, ramulis *strictis compressis*, *cortice pallido*, foliis *oppositis ellipticis coriaceis glabris petiolatis integris in axillis venarum primariarum* glandulis *cavis pilosis præditis*, stipulis *interpetiolaribus solitariis triangularibus cuspidatis persistentibus*, floribus *in axillis oppositis sessilibus glomeratis parvis*, alabastris *gemmisque resinosis*. Fructus *diametro subpollicaris*, *fœtidus*.

This well-marked genus, of which I have been fortunate enough to discover two very distinct species, seems to me most nearly allied to *Pouchetia* (Richard).

I have to remark that the vertical placentæ are at regular distances along the face of the dissepiment, the seeds closely packed like books on a shelf, and somewhat irregular from pressure, but the shape is that of a flat or slightly lenticular disc, or more like a cake, the margins not being attenuated. This structure is the same in both species—which may be named thus:—*D. sphærocarpum* and *D. apiocarpum*

(from *apion*, a pear). The former species has the fruit crowned with the limb of the calyx, the latter has merely a circular ring somewhat below the apex. The embryo, which has ovate cotyledons and a cylindrical radicle twice their length, is in the lower half of the seed; the point of the radicle being in contact with the testa, as in *Gardenia*, *Randia*, &c.

HAB. In montibus Syhadree, lat. 16°.

AURANTIACEÆ.

LUVUNGA.

L. *eleutherandra*; fruticosa, scandens, spinosa, spinis axillaribus reflexis vix curvatis, foliis trifoliolatis longe petiolatis, foliolis late ellipticis vel obovatis coriaceis glabris integris, floribus axillaribus paniculato-spicatis, spicis petiolo brevioribus.

Foliola 3 poll. longa, 1½ lata, petiolus communis 1–1½ poll. longus. *Calyx* cupuliformis, truncatus, integer, puberulus. *Petala* oblonga, coriacea, reflexa, 4 lin. longa. *Stamina* 8, petalis paulo breviora, filamenta *omnia libera*, lineari-subulata, complanata, apice in acumen breve filiforme repente attenuata, stylo longiora. *Stylus* brevis, crassus, *stigma* rotundatum, stylo vix latius. *Antheræ* lineares, obtusæ, dorso infra medium affixæ. *Ovarium* 3-loculare; *ovula* in quoque loculo duo, superposita, inferius funiculo longiore præditum.

HAB. In montibus Syhadree, lat. 16°–13°, frequens; fl. Jan., fruct. matur. Maio.

This plant differs from Roxburgh's *Limonia scandens* (now *Luvunga*, vid. 'Bot. Mag.,' tab. 4522), as will be seen principally by the free stamens, also by the shape of the leaves: the fruit, which is resinous and odoriferous, as in *L. scandens*, is about half the size. It would appear, therefore, that the union of the stamens is not of generic value.

LIMONIA.

L. *oligandra*; fruticosa, scandens, aculeis brevibus recurvis crebris armata, foliis trifoliolatis petiolatis, foliolis ellipticis apice obtuse acuminatis basi cuneatim attenuatis leviter crenatis, floribus axillaribus paniculato-racemosis, racemis (compositis) folia subæquantibus.

Foliola cum petiolo communi semipollicari 2½–3 poll. longa, 9–12 lin. lata. *Calyx* parvus, 5-dentatus, dentibus triangularibus acutis.

Petala 5, lineari-oblonga, apice marginibusque inflexis 1½ lin. longa. *Stamina* 5, filamenta subulata, libera, petalis alterna, iisque longiora. *Stylus* verus nullus; *stigma* 5-lobatum, post anthesin crescens, ovarium toro columnari crenato impositum, styliforme, 5-loculare, ovula in quoque loculo gemina, collateralia, pendula, caudata. *Fructus* pisi magnitudine, squamulis peltatis minutis conspersus.

Hab. In montibus Syhadree, lat. 16°–13°.

A common plant in the locality indicated, much more slender than the preceding, and climbing to a great height; it flowers in November and December, and has fruit in February. There are no true spines on this plant, but *aculei all along the stem.*

Ceropegia.

1. C. *angustifolia* (mihi); herbacea, erecta, pubescens, 5–6 poll. alta, radice tuberosa, caule tereti, foliis anguste lineari-lanceolatis acutis, pagina superiore marginibus præsertim pilosis, inferiore pallidis glaberrimis, floribus extra-axillaribus solitariis adscendentibus, corolla basi leviter ventricosa, tubo cylindrico: limbi segmentis anguste lineari-spathulatis extus glaberrimis intus subtiliter velutinis tuboque 5-costato extus purpureo basi viridi intus flavo lineis 15 atro-purpureis striato subæqualibus, coronæ lobis exterioribus 5 triangularibus ciliatis, apice bidentatis, dentibus subulatis, interioribus longis linearibus apice leviter recurvatis flavis glabris.

Hab. In pascuis saxosis prope mare, prov. Malwan; floret Julio.

This plant will be classed with *C. spiralis*, R. W., and *pusilla*: from the latter it is distinguished by narrower leaves, a longer and more slender flower, by the segments of the limb being about equal to the tube of the corolla, as well as by this species not being glabrous. In general appearance it is much more like *C. spiralis* than *pusilla*.

2. C. *ophiocephala* (mihi); herbacea, tota hispida, volubilis, foliis late lanceolatis basi rotundatis vel cordatis apice acuminatis utrinque hispidis subtus pallidis, pedunculis extra-axillaribus hispidis petiolo paulo longioribus pauci(3–4)-floris, sepalis lineari-subulatis patentibus, corollæ tubo adscendente basi leviter ventricoso atro-purpureo glabro, limbi laciniis tubo triplo brevioribus oblongis obtusis apicem versus angustatis basi purpureis medio flavis apice læte virentibus ibique parce ciliatis, corolla sesquipollicari, coronæ stamineæ exterioris lobis 5 connatis obtusis bifidis ciliatis flavis

purpureo-marginatis interioribus elongatis flavis apice uncinato-reflexis, folliculis linearibus glaberrimis 4–5 poll. longis, purpureo-maculatis, pedicellis primum adscendentibus deinde nutantibus, fructiferis erectis.

HAB. In insula Carauja, prope Bombay.

This is most nearly allied to *C. Jacquemontiana*, which is now before me. It differs from that species in the shape, colour, and relative proportions of the tube and limb of the corolla, the segments of which, in *C. Jacquemontiana*, are *broader upwards*, and entirely green, much larger than in the present species, and the flowers far more numerous. The leaves are similar to those of *C. Jacquemontiana*, but are never softly tomentose, as in that plant. The exterior lobes of the corona in C. *ophiocephala* are united nearly to their summits.

Nat. Ord. UMBELLIFERÆ.

Tribe SILERINEÆ?

POLYZYGUS. Genus novum.

GEN. CHAR. *Calycis margo* 5-dentatus, dentibus exterioribus majoribus. *Petala* oblonga, acumine inflexo. *Fructus* a tergo compressus, ovatus, glaber, nitidus, multijugatus, inter juga primaria, secundaria gemina, omnia subæqualia, filiformia, aptera, valleculæ omnes vittatæ, commissura 8-vittata. *Involucrum* nullum vel bracteolæforme, involucellum triphyllum, unilaterale. *Flores* albi, in disco steriles, *stylus* subnullus; in radio fertiles, *styli* longi, divaricati, purpurei.—Herba *pedalis, tota glabra*; radice *tuberosa*; caule *erecto parce ramoso striato inferne tereti superne angulato sulcato*; foliis radicalibus caulinisque *biternatis*, petiolis *communibus partialibusque subæqualibus*, foliolis *triternato-pinnatisectis*, segmentis *cuneatis et ovatis inæqualiter serratis*, serraturis *mucronulatis*; ramis *bifariis ex foliorum axillis paucis umbellis terminalibus axillaribusque nudis.*
HAB. In prov. Malwan; floret Jun. et Jul.

HERACLEUM.

H. *Concanense*; bipedale, totum parce patentique hispidum, caule erecto striato dichotomo-ramoso, foliis biternatis, foliolis trilobatis vel ternato-sectis, segmentis ovatis basi cuneatis inæqualiter serratis, serraturis calloso-mucronatis, foliis superioribus in petiolum vaginantem redactis.

Umbellæ radii 5–6. *Involucrum* 1–3-phyllum, unilaterale. *Involucellum* 5-phyllum, *foliola* ovata, acuminata, 3-nervia, glabra, exterioribus majoribus. *Calycis margo* 5-dentatus, dentibus 2 exterioribus ovatis obtusis, 3 interioribus obsoletis, sed calycis margo ibi incrassatus. *Florum radii petala* exteriora majora, rotundata, biloba, inter lobos lacinula brevi inflexa, *petala* interiora late ovalia, acumine brevi inflexo. *Stylopodium* magnum, conicum, subdidymum, glanduloso-punctatum. *Styli* parum divaricati, acutiusculi, stylopodio breviores; pedicelli latere interiore jugo glandulifero instructi. *Fructus* ovatus, glaber, vittæ dorsales 10-lineares, in valleculis intermediis geminis, in lateralibus ternis. *Commissura* 6-vittata, vittis intermediis distantioribus.

Hab. In collibus Concanensibus; fl. Julio, flores albi.

Pimpinella.

P. *adscendens*; caulibus diffusis adscendentibus, foliis radicalibus semipedalibus pinnatis, foliolis 6-jugis rotundato-ovatis basi truncatis vel cuneatis grosse et inæqualiter crenato-serratis, foliis caulinis paucis 1–2-jugis supremis pinnatisectis.

Caules parum ramosi, teretes, læves, striati, *umbellis* in ramis cauleque terminalibus, *involucro* 8-phyllo, *foliolis* subulatis ciliolatis brevibus, involucello 3-phyllo unilaterali, foliolis pedicellum æquantibus. *Calyx* setulis albis hispidus, edentatus. *Petala* alba, late obovata, extus parce hispida, acumine inflexo apice truncato. *Stylopodium* magnum, depressum. *Styli* filiformes, obtusi, sub anthesi brevissimi, postea elongati. *Fructus* didymus, ovatus, a latere contractus, hispidulus.

Hab. In fluminum Concanensium ripis; floret Oct. et Nov. *Apii Petroselini* odorem habet.

Nat. Ord. ORCHIDEÆ.

Habenaria.

1. H. *laciniata*; caule pedali folioso, foliis lanceolatis acutis 5 poll. longis, bracteis ovario paulo brevioribus, sepalo supremo ovato obtuso, lateralibus oblongis, petalis bipartitis lacinia posteriore lineari spiraliter contorta, anteriore setacea breviore, labelli tripartiti

laciniis filiformibus, intermedia lateralibus paulo latiore et duplo longiore, calcare gracili clavato, labelli lacinia intermedia paulo longiore ovario breviore.

H. *lancifoliæ* Rich. affinis.

Flores albo-virescentes.

HAB. In insula Salsette; fl. Augusto.

2. H. *modesta*; caule basi folioso, superne nudo, foliis . . . , bracteis ovario duplo brevioribus, labelli trifidi laciniis lateralibus lineari-lanceolatis liberis patentibus, lacinia intermedia ovata obtusa breviore introrsa cum supremi sepali petalorumque apicibus cohærente columnamque tegente, calcare filiformi vix clavato ovario paulo longiore.

Processus carnosi, rotundati, parvi. *Flores* albo-virescentes.

HAB. In insula Salsette; fl. Augusto.

3. H. *Caraujensis*; foliis inferioribus subrotundis, superioribus oblongo-lanceolatis trinervibus, bracteis acuminatis ovario brevioribus, sepalo supremo rotundato, petalis semiovatis obtusis, labelli tripartiti lacinia intermedia oblonga obtusiuscula, lateralibus brevioribus cuneatis apice truncatis, calcare clavato ovario breviore.

Flores parvi, lutei.

HAB. In insula Carauja, prope Bombay.

4. H. *candida*; caule pedali folioso, foliis basi vaginantibus lineari-lanceolatis acutis mucronatis 3–5-nervibus superne in bracteis floralibus transeuntibus, bracteis ovario paulo longioribus flore brevioribus, sepalo supremo ovato obtuso lateralibus oblongis obtusis petalis integris oblongis acutiusculis, labelli trifidi, lacinia intermedia late lanceolata obtusa lateralibus lineari-falcatis acutiusculis, omnibus longitudine subæqualibus, calcare gracili filiformi ovario breviore, processubus carnosis compressis lineari-oblongis obtusis.

Flores candidi, 6–7. *H. Heyneanæ* affinis, sed satis distincta. *Folia* inferiora 2¼ poll. longa, 6 lin. lata.

5. H. *diphylla*; caule semipedali, foliis 2 radicalibus carnosis orbiculatis basi cordatis obscure 7-nerviis convexis in solum arcte adpressis, bracteis caulinis crebris subulatis basi vaginatis, floralibus ovario duplo brevioribus, sepalo supremo late ovato acutiusculo 3-nervio, lateralibus ovatis acutis 3-nerviis sub anthesi patentibus, petalis lineari-falcatis acutis erectis sepalis minoribus, labelli tripartiti laciniis omnibus filiformibus, lateralibus intermedia longioribus

adscendentibus reflexis apice spiraliter contortis, calcare pendulo filiformi subclavato breviter mucronato, ovario paulo breviore, processubus carnosis linguæformibus intense viridibus labelli basi adnatis.

Flores pauci, 5–6, distantes, albo-virescentes, sc. perianthii partibus omnibus basi albis apice viridibus. *Caulis* gracillimus, strictus, folia sesquipollicaria longitudine et latitudine. *Glandulæ* albæ, sphæricæ, minutæ, basi antheræ parallelæ.

Hab. In planitiebus graminosis Concani Australioris copiose; fl. Julio.

6. H. *suaveolens*; caule semipedali basi tantum folioso, foliis lanceolatis acutis erectis complicatis scapo dimidio brevioribus, scapo angulato erecto medio unibracteato pauci(3–4)-floro, bracteis floralibus foliaceis ovato-lanceolatis acutis vaginantibus ovarii longitudine, sepalo supremo late lanceolato acutiusculo cum petalis erecto haud galeato, sepalis lateralibus falcatis acutis sub anthesi deflexis, petalis sepalisque conformibus æquilongis, labelli trifidi lacinia intermedia lineari acutiuscula, lateralibus latioribus brevioribus apice oblique truncatis denticulatis, calcare pendulo filiformi vix clavato ovarii longitudine, antheræ parallelæ contiguæ, processubus carnosis brevissimis truncatis.

Hab. Inter Vingula et Malwan, rarissima.

Jasmine-scented *Habenaria*: the form of the lip and the colour are those of *H. longicalcarata*, which is also a sweet-smelling species.

CŒLOGLOSSUM.

C. *luteum*; foliis radicalibus 3–4 anguste lineari-lanceolatis acutis complicatis cæteris acuminatis squamæformibus, spica gracillima multiflora, bracteis acuminatis ovario duplo brevioribus, labelli tripartiti basi callosi laciniis lateralibus filiformibus intermedia linguæformi obtusa duplo longioribus, calcare filiformi cylindraceo vix clavato ovarii longitudine.

Caulis pedalis, strictus. *Folia* 2–2½ poll. longa, 3–5 lin. lata. *Sepala* oblonga, obtusa; *Petala* iis paulo latiora, æquilonga. *Processus carnosi* lineari-clavati, adnati, facie superiore glandulosi. *Labelli callositas* transversa, bidentata.

Hab. Prope Malwan; fl. Augusto.

Nat. Ord. LEGUMINOSÆ.

Tribe Cajaneæ.

Leucodyction. Genus novum.

Calyx bibracteolatus, campanulatus, bilabiatus, ad medium 4-fidus, labio superiore integro mucronato, inferioris tripartiti laciniis lanceolatis, intermedia paulo longiore. *Corollæ petala* æquilonga, calyce duplo longiora. *Vexillum* obovatum, ecallosum, breve unguiculatum, sub anthesi reflexum. *Alæ* rectæ, obtusæ. *Carina* falcata. *Stamina* 10, filamento vexillari libero, diadelpha, subæquilonga, antheræ conformes. *Ovarium* sericeo-tomentosum, uniloculare, 4–5-ovulatum. *Stylus* adscendens, glaber, filiformis, petalis longior. *Stigma* acutiusculum, stylo haud crassius. *Legumen* lineare, mucronatum, compressum, 4–5-spermum, inter semina *lineis transversis obliquis* constrictum. *Semina* ovalia, approximata, subcompressa, quodcunque semen membrana tenui hyalina vestitum. *Umbilico* ovali, estrophiolato.—Herba *volubilis, e radice lignosa* caulibus *plurimis filiformibus*, foliis *pinnatim trifoliolatis*, foliolis *lineari-oblongis obtusis mucronulatis albo-reticulatis*, stipellis *minutis setaceis*, stipulis *parvis setaceo-acuminatis*, floribus *axillaribus in pedunculo brevi solitariis vel binis purpureis*, leguminibus *adpresse strigosis*.

Hab. In rupibus provinciæ Malwan, in culmis graminum.

A singular little plant, with wiry purple stems, climbing up the stems of grasses in very barren rocky ground. The anther-tube is very persistent, and is to be found on the half-grown legume. Corolla 3 lines in length, dark purple.

Cajanus.

C. *Kulnensis*; herbaceus, caule volubili filiformi pilis fulvis patulis pubescente, foliis ternatim trifoliolatis, foliolis rhomboideo-ovatis breviter acuminatis supra minute scabridis subtus pubescentibus et glandulis cerinis conspersis, lateralibus valde inæquilateris, stipulis ovatis acuminatis ciliatis, stipellis setaceis, racemis axillaribus pauci-(6)-floris folia subæquantibus, leguminibus lineari-oblongis basi apiceque angustatis pilis longis mollibus viscidis vestitis 5-spermis inter semina oblique constrictis.

Foliola 2 poll. longa, 1¼ poll. lata, *petiolulis* brevissimis æquilongis.

Petiolus communis 2–3 poll. longus, patenti-hispidulus, canaliculatus. *Calyx* campanulatus, breviter 4-fidus, subbilabiatus, glandulosus, *labium superius* breve, latum, bidentatum, *labii inferioris lacinia* intermedia lateralibus duplo longior et angustior. *Vexillum* rotundatum, emarginatum, basi bicallosum, sub anthesi reflexum, dorso purpureum, unguis marginibus inflexis. *Alæ* basi purpureo-maculatæ, ibique calcare carnoso præditæ. *Stamina* 9 et 1; *antheræ* ovato-oblongæ, utrinque obtusæ. *Staminis liberi filamentum* basi incrassatum, geniculatum; *ovarium* 5-ovulatum, sericeo-tomentosum. *Stylus* hispidulus, supra medium incrassatus. *Stigma* capitatum. *Corolla* persistens, 10 lin. longa, pedicellis geminis 8 lin. *Racemus* 3–5 poll. longus. *Semina* ovato-rotundata, *carunculus* magnus, bifidus.

Hab. Prope vicum Kulna, in provincia Warree, rara.

2. C. *Goensis*; tota corolla excepta pilis fulvis mollibus villosa, caule volubili, foliis *pinnatim* trifoliolatis, foliolis ovato-rotundatis breviter acuminatis subtus glandulis cerinis conspersis, lateralibus valde inæquilateris, stipulis triangularibus acuminatis, stipellis setaceis, racemis axillaribus et terminalibus pedunculatis multifloris, folio duplo-triplo longioribus, leguminibus omnino ut in præcedente.

Foliola tactu mollissima, 2 poll. longa, fere 2 poll. lata, petiolulo terminali cæteris 6-plo longiore. *Petiolus* communis 1½–2 poll. longus. *Calyx* hirtus, semipollicaris, infra medium 4-fidus, labium superius profunde bifidum, laciniis omnibus lanceolatis acutis, infima cæteris longiore. *Corolla* calyce dimidio longior, tota flava. *Vexillum* sub anthesi reflexum, basi bicallosum. *Stylus* glaber, supra medium incrassatus; *stigma* capitatum.

Hab. Ad pedem jugi Syhadrensis, in prov. Goa, rara.

This is a much stouter and more showy species than the former: it climbs to the top of large shrubs, in the manner of *Cylista scariosa*, and is distinguished by its long erect racemes of bright yellow flowers. Both species agree entirely with *Cajanus* as far as structure is concerned, but in their climbing habit they are more like *Cantharospermum*; —perhaps they will serve to unite the two genera. I may here remark that the carunculus on the seed of *Cajanus Indicus* is very far from being inconspicuous, as stated by W. and A. in their Prodromus, if a full-grown unripe seed be examined.

(*To be continued.*)

Journal of an Excursion from SANTAREM, *on the* AMAZON *River, to* OBIDOS *and the* RIO TROMBETAS; *by* RICHARD SPRUCE, ESQ.

(*Continued from p.* 232.)

Our longest ramble whilst at the cachoeiras was undertaken on the 28th, in the hope of reaching the summit of the Serra de Carnaú; and as it exhibits the luxury of exploring a Brazilian forest in a different light from what we have been accustomed to view it in, I may be excused for giving a somewhat detailed account of it. We started at six in the morning, with the pilot and Danielo for our guides, each of them armed with a musket and trésado, and with the mulatto to carry provisions for the way. It should be observed, that from the foot of the cachoeiras, the Serra de Carnaú was totally invisible, from the intervening forest, although we had caught a view of it some miles below. My own idea was that our best course would be to ascend the river until we came to some igarapé which plainly descended from the serra, by which method we should be sure of our way; but our guides fancied that the serra lay considerably to the east of the cachoeiras, and, contrary to my advice, after coasting the river for about half an hour, they struck across in the supposed direction of the serra, ascending hills and descending into valleys choked up with bamboos and the prickly *Murumurú*. As I anticipated, they were soon at a loss which way to go; twice they climbed up into trees and traced out (as they thought) a route to the serra, but at length we came to a complete stand-still in the midst of an Assai-swamp. I sent the pilot up a neighbouring lofty tree; but we had got into low ground, and he could make out nothing. This was about midday, and whilst we were all deliberating and beating about for an opening, the pilot and Danielo, without speaking of their intention, started off to retrace their track to the canoe. We were thus left alone with the mulatto, in the midst of one of the densest and most desolate forests that even South America can show. I immediately determined to seek out an igarapé in some of the valleys, and to follow it until it joined the river, when we should at least be certain of our direction, if not of our distance from the canoe. We did not look long ere we found an igarapé, and proceeded to trace its downward course. But we had scarcely started when we were warned of a coming storm by a low distant murmur, which speedily deepened into a sound as of the rushing of mighty waters. The thunder rolls over our heads, and the lofty trees bend like willows under the force of the hurricane; then, after a sullen pause, rendered almost awful by the circumstances in which we are placed, the rain bursts upon us in a perfect torrent. We were threading the thicket in Indian file, Manoel first and I next, but such was the noise of the rain and tempest, that we could not hear each other speak, and Mr. King, lingering behind to break open a castanha, was unfortunately left. He very soon lost his way, by going up an igarapé which ran into the one we were following, and had so slight a fall that he did not perceive he was ascending. He went on thus for about a mile ere he found out his mistake—floated two leaves on the stream to assure him of its direction, and then turned back; but we were already far in advance. By halting somewhat for him, I allowed Manoel to get out of sight, and I was above half an hour before I came up with him. The rain still continued unabated, and ran down my back and breast in streams. The igarapé, at first a precipitous mountain-stream, soon descended into a valley, where it turned and doubled, as if determined to lose us; and so thick was the vegetation on its banks, that often we could scarcely effect a passage: the groves of entangled bamboos and cut-grass, especially, were only passable on our hands and knees. Manoel grew dreadfully frightened: he said that we should certainly have to pass the night in the forest in our wretched plight—that onças were numerous, and we had no arms to defend ourselves—that the igarapé we were following would infallibly end in a palm-swamp (which I knew to be not at all impossible); and his complaints at length grew to such a pitch, that I told him he might leave me and choose his own path, for that I was not afraid to be alone; but this only frightened him the more.

We called on our companion until we were hoarse, and I made Manoel climb a tree and shout at the top of his voice, as well as endeavour to spy out some known object; but we had no response, nor could he see anything but the tops of other trees. We crept slowly on, occasionally halting to call out and to listen, and I began to feel exceedingly anxious about our companion's fate; at length we heard his voice, far behind us, and about three o'clock, to our great joy, he rejoined us. The rain had now ceased, and in an hour more, our patience being nearly exhausted, we reached the embouchure of the igarapé; but the river presented an aspect quite strange to us—still and tranquil as a lake, with the very mountains we had been in search of to the north of us and close at hand, while at some distance westward of us another stream came rushing over rocks to join the one we were standing near, with a rocky and romantic peninsula at their junction. This lake-like branch of the river we afterwards found was known to the castanha-gatherers by the name of the Rio Morte. The Serra de Carnaú appeared densely covered with mato, with the exception of two or three small patches of bare rock, and could be scarcely 1,000 feet high from the lake. It extended to the eastward, and the main river seemed to come over a low shoulder to the westward.

I took a hasty glance at the rocks in the river, and chipped off fragments with my hammer, ere we commenced the descent. When the sun was getting low, I sent Manoel on before us, as I found he could make his way through the mato much more rapidly than we, with instructions to cook our dinner when he arrived at the canoe; but I had no idea the distance was so great as it proved to be. The scenery between the falls is very beautiful; the river expands, and contains numerous rocky islands, some covered with wood, and others merely blocks of granite heaped together, with no vegetation except the above-mentioned *Podostemacea*, where the water covers them.

We continued to push through the forest until sunset. The moon was to rise with fading twilight, but ere that time the obscurity was too great to allow of our proceeding further; we therefore sat down in the angle of two buttresses at the base of a large tree. But both tree and ground were very wet; we ourselves were still soaked, for even after the rain ceased, every bush we pushed through, every sipó we cut, brought down upon us a shower of drops. Our situation was certainly anything but enviable. At the best I am not a very robust fellow, and Mr. King's illness had robbed him of his wonted strength; we were without arms, save my companion's trésado and my lichenological hammer—no materials for procuring light, and here benighted in a boundless forest, with we knew not what companions near. Our only guide was the river, which we could always keep within hearing, if not in sight; and fortunately I had a small game-bag, containing farinha and dried fish, of which we made a meal under the tree. I began shortly to feel very chilly—my companion was strongly inclined to move no further, but I represented to him that to sleep there would be to sleep the sleep of death—and the moon having risen, we resumed our journey; but the night was cloudy, and hardly any light could penetrate the dense forest. We scrambled on, now plunging among prickly palms, now getting entangled in sipós, some of which were also prickly. Even by daylight these sipós are the principal impediments to travelling in the untracked forest; what must they be, then, in the night? Your foot trips in a trailing sipó—attempting to withdraw it, you give the sipó an additional turn—and in stooping to disentangle it, very likely your chin is caught as in a halter, by a strong twisted sipó hanging between two trees. At one time we got on the track of a large stinging-ant: these animals crowded on us and stung our ankles and legs terribly, and we were many minutes ere we could get clear of their neighbourhood. During the day we had encountered a colony of yellow wasps, such as fasten their nests of three or four cells to the underside of the leaves of trees, and these had stung our necks and hands; besides which we had at various times been attacked by the black tree-ants and the villanous formiga de fogo: but all those were enemies such as we daily encountered in the forest.

To return to our narrative: the forest was still so dense that the moon's rays could not penetrate it, and coming up to the river, at a place where several large granite blocks stood out of it, appearing tolerably dry, we scrambled to them and lay down until the moon began to approach the zenith. There was now just light enough to enable us to select the thinnest parts of the forest, but scarcely to show what stones, stumps, and sipós lay in our way. With cautious steps and slow, we persevered, always keeping the river within hearing, and at length, to our great satisfaction, reached the canoe a little after one o'clock in the morning.

In such a journey we could not gather much. We found a curious *Byttneriacea*, resembling the *Cacao-rana*, except that the enlarged and persistent calyx formed a cupule for the fruit, resembling that of an acorn. A *Calathea* covered the top of a sandy hill, under the trees, putting forth from its roots a few yellow, crocus-like flowers. We got a few other plants, and I stuffed my pockets with fruits and mosses.

But we had something to show for our journey besides plants. Our clothes and hands were torn, and the latter thickly stuck with prickles, some of them venomous. Our limbs were stiff for many days afterwards from the wetting, and I myself suffered much from lumbago for about a week. We had got, also, a sufficient number of mocuins and carapatos on our skins to keep them in constant irritation for some time afterwards.

When we reached the canoe, our *faithful* guides were quietly sleeping by their fire: they had arrived about four o'clock. When reproached for deserting us, they pretended that they had supposed we were all the while following them! I was not at all surprised at their conduct, for I had heard that not very long ago a crew of Tapuyas had deserted altogether a gentleman in the Trombétas, who was thus left alone and unable to navigate his canoe for several days, until another boat happened to pass that way. There is something repugnant to an Englishman in the forced service to which these people are subjected, it is so manifestly unjust; but it is bringing its own reward. Numbers of Tapuyas have fled, either to the unexplored parts of Brazil, or across the frontier into the English, Peruvian, and other neighbouring territories. From this and other causes, their number has so diminished, that there are barely sufficient to meet the various calls for their services; and as they are quite aware of this, they take great liberties, working just as much or as little as they like, knowing that you must be content with that or go without, and caring neither for imprisonment nor any other punishment. But although the Brazilians do not merit any commiseration for this state of things, it is felt to be a great annoyance by strangers who travel through their country.

Since arriving at the cachoeiras my crew had been very refractory: they evidently disliked the place, and wished themselves away from it. The sound of the waterfalls, they said, was "muito triste," and prevented their sleeping, even if the nights had not been so cold as they found them,—though Mr. King and I thought the temperature quite agreeable. Fish and game were abundant, but I had unwisely brought a good supply of pirarucú, and when an Indian has food for to-day he cares not for to-morrow; there was, therefore, no getting them to fish; and though I gave them powder and shot, they were either lazy or unskilful hunters, for they killed nothing. Then we had frequent and heavy rain, coming on at any hour of the day or night, and often without warning; this made their night's lodging very uncomfortable, for they were too idle to erect a little house (as they had talked of doing in coming up), and which would not have cost them above three or four hours' labour. I had every reason to believe that if I remained much longer they would make no scruple of eloping and taking the canoe with them, which would have left me in a dreadful predicament. Hence, though I had hoped when setting out from Obidos to have at least a peep into British Guiana, if not actually to set my foot over the boundary, ere I returned, and though this seemed now within my reach, I felt it necessary to defer its accomplishment until a more favourable opportunity. Another serious reason for hastening my departure from the cachoeiras was that Mr. King's indisposition continued unabated, and he was daily becoming more and more reduced, all the remedies we could devise having proved unavailing. Our canoe, too, though above the ordinary size and quite too large for our crew, began to be filled to overflowing with my collections. The plants, dried and drying, occupied so much of the space within the tolda as not to allow us room to sleep except in very uneasy postures, and every spare place was filled with panneros of *Orchises* and other living plants. We had, also, great difficulty in getting dry paper for our specimens, though I left a man at the canoe every day for the purpose of seizing a favourable interval to expose it in the sun.

On the 30th of December we bade adieu to the cachoeiras of the Aripecurú, the regret I felt at quitting them being shared, I believe, by none of my companions. As we fell down the stream I was astonished to remark how it had filled during the last five days, to such an extent, indeed, that we had now no occasion to guard against sunken or projecting rocks. By sunset we reached the second tartaruga-bank from the falls, and drew up for the night. I may here remark that the sand of all these banks (of which I send a specimen) consists of extremely large grains, containing many unbroken crystals of hornblende, &c. It has, also, a considerable quantity of polished black pebbles, which a merchant from the mines of Cuyaba (now at Santarem) and others have recognized as a sign of the presence of gold, and possibly of diamonds. I have something else to do than to undertake such a dirty task as the digging for gold, but I shall not be urprised if some of my neighbours here are induced to try their ortune on the Aripecurú, in consequence of what I have seen there.

December 31.—Last night was gloomy throughout. We started at six, and from half-past seven to near eleven we had heavy rain. At five minutes after eleven we passed the mouth of the Rio Ariramba on the left bank, a narrow winding furo, leading to the Rio Cuminá, but said to be now impassable for our canoe, on account of sandbanks: this furo I had not noticed in ascending.

Gloomy and exceedingly cold all day: temperature at midday, inside and outside of cabin, 75°.

Yesterday afternoon we had heard the deep short baying of an onça on our right: Diogo imitated him with a cuyamboca, and he followed us for an hour, often coming near, but never allowing us to sight him. This morning, also, we heard an onça (probably the same) for an hour before sunrise, but he seemed at a great distance.

Steep white banks, looking afar like limestone, proved to be indurated clay and sand, continued deep under water; the structure is rather oolitic, grains of quartz forming the nuclei. There are also some reddish-coloured and yellow masses. On these cliffs grew a magnificent *Marcgraaviacea*, with racemes of crowded flowers, twenty inches long, projecting beyond the mass of deep green foliage like so many plumes. The curious saccate bracts, above an inch long, as many as two hundred of them on one raceme, are each accompanied by a small purplish flower, resembling that of a *Clusia* in miniature. In the same place I was glad to get the *Müra-pixuna* (*i. e.*, *Pao préto*, black wood) in flower. It is a curious *Leguminosa*, coming near *Swartzia*, but scarcely referable to that genus; the branches, &c., covered with a brown felt; large pinnate leaves, with winged petioles; flowers of one large petal growing in naked racemes from the bare stem and branches; calyx leathery, 4-cleft; four groupes of stamens, one turned upwards and with elongate anthers, the other three downwards and with roundish anthers; the petal and the filaments yellow above, violet below. The tree attains a large size in favourable situations; its timber is nearly black, hard, and durable, and much esteemed for cabinet-work.

At five o'clock we reached the mouth of the Jarenucá, our rate of travelling having averaged perhaps a little less than three miles per hour.

1850. *January* 1.—We quartered last night on the same sandbank as on the first night after entering the Aripecurú. Heavy and long-continued rain during the night. We heard an onça at five this morning, and a little after sunrise passed a montaria coming up the river on the opposite side, containing three persons, the first we had seen save our own party for above a week.

I was desirous to visit a lake communicating with the Rio Cuminá, called Lago Salgado, for the purpose of ascertaining whether its waters are really saline, as the name implies. Instead, therefore, of descending by the western channel of the Aripecurú, which we had ascended, we passed through the eastern, and thus struck the Rio Cuminá at a higher point. The first reach of this river in ascending from the eastern outlet of the Rio Aripecurú, is E. by S., and not more than two hundred yards long: it then turns to N. E. by E. for another short reach, at the end of which it expands into a roundish lake, of perhaps two miles in diameter. The Cuminá may almost be said to commence in this lake, for on the further side, where it enters, it dwindles to a slender igarapé, which, however, is stated by those who have ascended it to have its source at a considerable distance in the interior, whence it flows nearly due east, through an exceedingly dense and overhanging forest. Just within the mouth of the lake an igarapé enters on the right, from E. by S., coming from the Lago Salgado. The igarapé trends slightly to northward of east before reaching the mouth of the lake, to which twenty minutes' rowing brought us. We could none of us detect any trace of salt in the water, and my Tapuyas said that it was saline only in the driest part of summer. Two of them had ascended the Cuminá beyond the lake, and spoke of a salt-spring a little distance from its northern bank, by the occasional overflowing of which the waters of the river were rendered so saline as not to be drinkable. Such was certainly not the case at present.

We now turned for the purpose of reaching the entrance to the Trombétas. I estimated the distance between the eastern and western outlets of the Aripecurú at three miles, being the length of the narrow island spoken of on the 22nd of December.

January 2.—It was about 'Ave Maria' last night when we reached the now deserted Estacamento, but the wind springing up just then strong down the river, and our men being well disposed, we held on our course until after midnight, when we gained our former station at the mouth of the Rio Caipurú. The rain had been falling for some time, and continued heavily all night, making us all very uncomfortable and (for the first time) coming through the sides of the tolda, and soaking some of my books. In the morning we learnt to our great regret that our kind host, Senhor Angelo, had been suddenly called away to below Obidos, on important business, and was not expected to return until the end of the week. I thus missed much interesting information, which I had calculated on receiving from him; but his sister, Donna Cæsaria, gave us a hearty welcome, and I determined, if the rain should cease, not to lose the chance of seeing the Pao de Cédro in a living state.

By ten o'clock the rain cleared off, and, allowing a little time for the wet to dry up, we struck into the forest, which was close at hand, accompanied by the feitor of Senhor Angelo, and were not long in finding a cedar-tree not too bulky to be cut down. It was accordingly chopped through, but another tree held it from falling; we severed this too—still it would not fall, for the tops of both were so fastened to other trees by sipós, as to defy our efforts to bring them down. As it lay over, Diogo climbed up as far as the first leaves, which he cut off, but there were no flowers or fruit. The bark and wood of the Cédro have a very agreeable resinous odour. It obviously belongs to the same family as the cedar-wood of Demerara (*Icica altissima*), but I know not yet if it be the same species. Hardly any tree attains a larger size, and its floating trunks are the greatest obstruction to the navigation of the Amazon in the wet season.

In ascending from Santarem I measured a trunk that had been cast on shore, and, though the top was broken off, the length of the remainder was 110 feet, and the thickness proportionate. At the base, the four projecting buttresses (or *sapopémas*, as they are here called) measured each nine feet across. We afterwards cut down a Lauro, and took specimens of its wood and leaves. All the arborescent *Laurineæ* produce excellent timber, but that is most esteemed which is sweet-scented. The Indians distinguish a great many trees by the smell and taste of their wood and bark. Were it not that Nature has wisely endowed them with great variety of odour and flavour, many of the trees of tropical forests would be quite undistinguishable, such a large proportion of them have smooth bark, and so utterly impossible is it in most cases to get a view of their leaves. The bark and wood of the *Itaüba* have a very fine scent, which the wood retains for many years, but it has nothing resinous in it.

In a walk afterwards up the shore of the Caipurú, I got some trees in flower that were new to me, and some mosses and *Hepaticæ* in fruit.

Besides the timber-trees above-mentioned, the following grow in the forests of the Caipurú, but at such a distance that I was unable to visit them :—*Uaitá,* a tree of large size, but the heartwood alone is used, and is in great request for walking-canes and other fancy articles ; *Parácu-uba,* a tree with very hard heartwood, coloured like old mahogany, and with a delightful odour : it is excellent for cabinet-work, and chips of it are used for making a medicinal tea ; *Jutahi,* a large tree with hard but not very durable timber : the bark is employed for making canoes, and the fruit is eatable.

Donna Cæsaria treated us to-day to a porco do mato for dinner, beautifully cooked, and affording us a delightful change from piraruců, which was like eating so much dry pine-board. She and all her household were very curious about the object of our collections. I explained it as well as I could, but the senhora was not satisfied, and seemed to have arrived at the conviction that my dried specimens were intended as patterns for fabrics of cotton and silk, England being always associated in the minds of these Brazilians with the idea of printed stuffs. I showed her, through my lens, some of those beautiful lichens which, in this country, grow on the leaves of trees ;—“ O Dios ! ” exclaimed she to her women who were standing around, “ em Ingalaterra tudo isto vai ser pintado em chíta !” (in England all this will be painted on calico !) Her last command to me, on parting the following morning, was to send her one of the handsomest prints that our English manufacturers should devise from the materials I had collected near her fazenda ! In the evening she led me through the establishment, and showed me the comfortable cottages of the slaves—the cooking-house and apparatus — the mandiocca-furnaces, &c.— the process of soap-making—and, above all, I was most obliged to her for setting me right on the subject of making the Caraipé pottery. When I visited at Caripi a fabrica of this ware, I understood that the bark *in its simple state* was pounded down and mixed with the clay ; but it is quite possible that my imperfect knowledge of Portuguese at that time prevented my understanding the explanation that was given of the process. I now learnt that the bark *was first burnt*, and the ashes then mixed with the clay. I saw a quantity of the ashes, and Donna Cæsaria was kind enough to order some of them to be put into a small basket for me, which I now send you, just as I received it at her fair hands. The Caraipé-tree grows throughout the province of Parà, and here in the sertao, where metals are scarce, coppers are lined with it, and large mandiocca-furnaces are made of it, where it has to sustain an immense degree of heat. I often see immense pots for cooking in, exactly resembling our largest kail-pots in the north of England and Scotland, and when blackened by smoke looking quite like iron, yet made of Caraipé ware.

(*To be continued.*)

Notes on the Botany of JAMAICA; *written during a tour from Moneague, in that Island, on the 6th of May,* 1850; *by* DR. R. C. ALEXANDER.

In the following notes upon the Botany of Jamaica, it is not intended to give a continuous narrative of herborizations,—its Flora is too well known already,—but to make a few remarks on some of the more striking features of its vegetation.

A stranger landing at Kingston, as I did, about the end of November, taking a drive round the environs and a trip over to Spanish Town, and looking up at the craggy barrier of mountains lying to the north, might suppose it an island of little botanical interest. This lowland part of it is mostly covered with Cashew (*Prosopis juliflora*), Logwood (*Hæmatoxylon*), and various *Ingæ*, *Acaciæ*, and other shrubby *Leguminosæ.* Here and there, as on the railroad route to Spanish Town, he will see a group of negro huts, situated in gardens of Plantain, Cocoanut, and Bread-fruit, realizing his ideas of tropical scenery, and as he passes through the streets of Kingston, a most gorgeous array of flowers hanging over the garden palisades; but the general impression will be rather uninviting. Let him, however, take the St. Ann's road, and cross the mountain, and as soon as he is over the crest of the Mount Diablo, he will come upon as different a character of landscape as though he had travelled many degrees of latitude to the north;—a succession of undulating pasture-fields, with handsome trees in them, standing alone or in small groups, the Broad-leaf (*Terminalia*), the Cotton-tree (*Eriodendron*), Sandbox (*Hura*), Cedar (*Cedrela*), and tufts of Bamboo, abundance of water, herds of fine cattle and horses everywhere, and as varied and beautiful a park-like scenery altogether as there can be in the world. It is in this part, at a village called Moneague, about 1,500 feet above the sea, that I have been residing the last five months.

During December, January, and half of February, the rain was a great impediment to botanical pursuits. The heavy autumnal rains were over; but from sunrise, when it usually began to drizzle, there were seldom two hours together without a shower, till about four P. M., when the sky usually cleared up, and was followed by a brilliant starlight night. Since the middle of February there has been scarcely any rain at all. This, I understand, is the usual climate of the district, at these seasons. It is now beginning to rain again.

The conformation of this part of Jamaica is very singular. It is described in a memoir by Sir Henry De la Bêche, in the Geological Transactions. The whole surface of the country consists of a honeycomb limestone, full of depressions, called "sink-holes," into which the water drains, to burst out in large streams about Ocho Rios, St. Ann's Bay, and other places along the north coast. There are no continuous valleys sweeping into larger ones, and leading off to the sea, but all broken up into irregular risings and cavities. On the Mount Diablo range, and upon most of the isolated hills, there is still much of the primæval forest left. The cleared ground is, I may say, entirely pasture, for sugar culture in this part is abandoned, except the few canes that the negroes grow in their gardens. The grass most cultivated is the far-famed Guinea-grass, *Panicum jumentorum.* The older pastures, that have been left to a state of nature, consist chiefly of Pimento-grass and several *Paspala*, and, as compared with European and North American meadows, are almost entirely free from other herbage.

The trees are all, or nearly all, deciduous. Hitherto, the warmer the climate the more evergreens I have found. In Europe, as we travel southward, they increase more and more. At the Cape of Good Hope I think the native trees were all evergreen. In Jamaica, although they all cast their leaves, there is no one season at which the forests are bare, nor has even the species a fixed time. Nay, Dr. Gilbert Macnab informs me that he has seen cotton-trees on which one branch was bare and another in full leaf. I have heard from others that there are trees, more particularly fig-trees, which shed their leaves twice a year. In looking over a landscape we generally see here and there a naked tree, here and there one in fresh foliage, and the rest a mass of a rich dark-green hue. With most of them two or three weeks suffice for a complete renovation.

The trees most common in the parks and pastures are *Eriodendron anfractuosum*, two *Terminaliæ*, *Hura crepitans*, *Hippomane Mancinella*, *Calophyllum Calaba*, several Fig-trees and *Laurineæ*, *Bumelia salicifolia*, *Cordia platyphylla*, *Anona muricata*, various *Citri*, *Erythrina velutina*, *Piscidia Erythrina*, *Bambusa*, *Daphne tinifolia*, *Byrsonema coriacea*, *Areca oleracea*, Cocoa-nut and other palms, probably introduced.

This mixture of various types, that is seen in all tropical countries, contrasts strongly with the few genera, such as Oaks, Pines, and Hickories, that make up so large a proportion of our timber in the north. What most surprised me upon coming hither, directly from the United States, was to find so extremely few representatives at all of the Flora of that vast continent, and these chiefly in the shape of such genera as occur equally in South America, or such marsh-plants and ferns as are found all over the world. Jamaica would seem to be nothing else than an outlying portion of South America, and to have nothing to do with the northern continent, deriving its vegetation from a period in the world's history either anterior or posterior to its existence. This character of it is very strongly exhibited in the profusion and variety of *Melastomaceæ*, *Myrtaceæ*, and *Cinchonaceæ*, and the total absence of *Cupuliferæ* and *Abietineæ*, and is not much affected by the occurrence of a few mostly single species of *Rubus*, *Vaccinium*, *Viburnum*, *Clethrà*, *Asclepias*, *Euphorbia*, and *Ambrosia*, because they are either introduced weeds, or belong equally to the southern continent. *Garrya* certainly has hitherto been only found in *Jamaica* and *California*; but it has been but very lately discovered here, and will probably be found in the mountains of South America, when they have been explored. I met with it near the Portland Gap of the Blue Mountain, at about 5,500 feet, I should suppose, above the sea.

The general appearance of this part of the island is not so very strikingly exotic. But for the cotton-trees and palms, there is nothing very different from the aspect of extra-tropical countries. Indeed, the abundance of *Rubus Jamaicensis* and *Pteris caudata*, that hang over some of the lanes, might easily transport one to the green lanes of Europe. I speak of the north side of the great dividing ridge. Within this ridge and the north coast, aspect makes no difference in the vegetation. The sun is always so nearly vertical, that the same plants are seen in the same proportion, and the same cultivation is followed equally on all sides of a hill. Houses are usually built on isolated peaks, chiefly for the sake of the breeze, and partly perhaps from an idea of greater immunity from malaria ; although on this point most Jamaicans are very incredulous, and believe (at least they tell the stranger so) that he runs no greater risk of fever in Kingston, Spanish Town, St. Ann's Bay, or Bath, than on the hills,—that the immigrants and soldiers have killed themselves with new rum and exposure to the sun, and that, in short, there is not a healthier spot in her Majesty's dominions than any one of these four towns. A very general opinion prevails that there has been much less rain of late years, and that in proportion as the island has become drier and more barren, it has become healthier in every part. The fresher appearance of this northern side of it would seem to be owing to the dry wind blowing from the north-east, and depositing abundance of moisture during all the winter months ; while the Kingston side, receiving its wind from the south, is dry. Yet, widely different as the vegetation appears on a cursory glance in first travelling from the one side to the other, still the species, when collected and placed in the herbarium, are nearly identical. It is the relative proportion in which they occur that makes the difference. The ordinary traveller supposes he sees no plant the same on the two sides of the mountain. The collector, on the contrary, is disappointed that a day's toil rewards him with but some ten or twelve new species. It is thus that catalogues and collections lead to very false inferences in regard to the climate and character of a country.

The effect of the greater and less moisture of the two sides respectively, is exhibited in two articles of great commercial importance—coffee and pimento. The coffee of the Port Royal mountains in the south-east is of the finest description that comes to the London market :—about Moneague the berries are allowed to drop on the ground and rot, not even paying the expense of gathering. On the other hand, pimento, on the south side, is not worth rearing. You see a solitary bush here and there ; one of the handsomest that I have observed at all was on the Yallahs River; but it does not pay. In St. Anne's parish, in the north, it is, after cattle-farming, the main stay of an estate.

The mode of making a pimento-walk throws some light on the succession of crops in forest-trees, so remarkable in America. If the ground is kept cleared, the grass will grow up and stifle the young plants. It is necessary to permit the wild bushes to remain, and thin them out from time to time, always leaving enough to shade the pimento, until the young plants have acquired strength to shift for themselves, and they are then allowed the exclusive occupation of the ground. The elegant *Tetrazygia Fadyeni* (Hook. in Kew Garden Miscellany, 1849, t. 12), which seems to require exactly the same rocky soil and climate as the pimento, is often spared for ornament where the proprietor resides on his own estate, and but for the taste of these gentlemen would probably have been extirpated. It is a plant most difficult to rear in any other situation. Mr. W. Stewart, of Green Park, after many ineffectual attempts, only succeeded at last by bringing away a portion of the rock attached to its roots. Thus, without any exhausting of the soil or change of climate, the indigenous trees of a country may be unable to grow up for a certain period for want of companions belonging to very different genera, and may chance to be entirely superseded and driven from their native haunts by introduced exotics.

Among intruders of this kind, the most conspicuous are the *Mango* and *Guava*. The latter seems to be propagated by the pigs, which, after tearing up the ground in search of roots, drop the undigested seeds of the *Guava* into it. This shrub prefers low swampy places that are inundated in the rainy season, and affords food and shelter to thousands of rats, which build like squirrels in its branches. The rat is supposed to be the common European one, and to have been brought here in ships; but the head is much more elongated and pointed, and the fur more shaggy. When hunted with dogs, it takes refuge in the "sink-holes," where it is impossible to follow it. Dogs are often lost in these subterranean caverns, which must be of great extent, as the water flows out below in a uniform stream, and perfectly clear, let the rains have been ever so heavy, or the drought of long continuance.

In the same way as the pigs propagate the *Guava*, the bullocks disperse the *Inga Saman*, the saccharine pods of which in some degree replace the Carob of the South of Europe. Its introduction, like that of the Guinea-grass, was purely accidental:—some cattle were imported from South America, which had been fed on their passage with the pods of this tree, and upon landing dropped the seeds, which have since been dispersed in the same manner all over the island. It is a beautiful tree. With its numerous tufts of rose-coloured stamens, and elegant pinnate leaves, and its size and fine outline, and its usefulness, it stands queen among all the *Mimoseæ*.

I am tempted here, by the mention of bullocks, to advert to their instinctive habit of taking the same track to water. I had always supposed it a mere habit, and seen no other advantage from it than perhaps their more readily finding their way to and fro. But in these tropical regions (the zone to which the ox probably belongs, for it seems to have been used in India and Egypt from the remotest times), the final cause is obvious. The earth becomes so hard during the long season of drought, that when the rain descends, as it does at last in sheets of water, the most of it would run away to waste, were it not detained by these gutters, and conducted by them to the spots where it can best be stored up for use, namely, the ponds at which the cattle habitually drink. I was first struck with this, when watching a coloured overseer directing some work-people in making a drain to carry the rain-water to a pond, and observed that the line he had drawn ran for the whole length of the field exactly parallel with the cow-path, winding round every eminence and depression, the one beside the other. It may be asked, "Why then make the drain?" I presume because the footsteps of the animals, and the dust collected in their paths, would absorb too much of the water, and tend to fill the pond with mud.

To return from this digression: the *Mango* is another very conspicuous exotic intruder. It prefers the sloping side of pasture-fields, and is much valued for the shelter it affords to the cattle, and a highly nutritious food. All animals eat the mango fruit. There is no tree here with the branches and leaves so crowded, or that bears such a quantity of blossom. Why nature should waste so much power as she does in making abortive flowers for these *Anacardiaceæ* is not easy to see. A single panicle will, perhaps, have 200 flowers on it, and not one of twenty panicles bear a fruit, and the tree continues to blossom several months. There is one near my window that was in flower when I arrived in December, and is in flower now, in May. It is become as common as almost any indigenous tree.

The most conspicuous object in the landscape of this district is unquestionably the Cotton-tree, *Eriodendron anfractuosum*, DC., the growth of which is so singularly different from that of most dicotyledonous trees, that I am surprised to have never met with any description of it. Its outward form has been often enough described and pictured; —a lofty smooth columnar trunk, swollen in the middle, supported below by vast buttresses, and crowned at the top, some fifty or sixty feet from the ground, with a magnificent canopy of spreading branches. But the mode by which it attains this height is, as far as I am aware, unknown. All the timber-merchants and old residents agree in two points,—that the middle, the innermost part of the trunk, is so soft and spongy as to yield to the axe without being severed by it, and the outside a wood hard enough to be used for barrel-heads and shingles; and, secondly, that the great spreading branches at the top are the same that it once bore a few feet from the ground. If the wind tears off a bough, it is not replaced. I have seen several denuded trunks standing in the fields like great stone columns. There is no sign of anything like a leading-shoot, and successive whorls of boughs, as in other trees with long shafts. The Rev. G. Handford showed me, upon one of them near his house, the initials of several names that were inscribed upon the bark breast-high four years ago, and they are now much above my reach, fully four feet at least above the original level, and not in the slightest degree distorted. There is an iron spike close to these names, the head of which, though driven close into the tree, is not yet buried. Most people whom I ask have never thought on the subject, but Mr. Braham, to whom I am indebted, among other attentions, for that great botanical rarity, a branch of bamboo in blossom, which he procured me from a distant part of the island, has long been aware of the peculiarity of its growth, and, unable to explain it, has promised, as soon as the crop of cotton-wool is gathered, to have a tree cut down for examination. My impression is that the enormous buttresses lift the tree bodily many feet from the ground, and that it is by that process that Mr. Handford's tree is rising up so fast, names and all, and that the rest of the growth is effected at the bulging part, by some process analogous to that (whatever it may be) by which the Baobab attains its enormous dimensions. In these cotton-trees, after the trunk is grown near the base to a certain normal diameter, it does not seem to increase it at all. You see trees thirty feet high, with just as large a stem as those that are eighty feet. The height is generally easily measured, by pulling down the long roots and runners of wild figs, *Cissi*, and *Convolvuli* with which they are festooned, and stretching them between the hands. I find the usual height up to the boughs to be about nine stretches of five feet two, or about forty-five to fifty feet, but some are a great deal higher. It is lamentable to see a noble tree, when it has thus reached its greatest glory, fall an easy prey to a parasitic fig. A lady living a few miles off tells me, that when she was a child there was a lofty and beautiful tree of this kind near her father's house: she went to England, and returned about thirty years after, and there was then no vestige of the cotton-tree there, but a very handsome full-grown fig-tree in its place. A small plant of fig establishes itself in a rent or fork of the cotton-tree, and throws down a root to the ground, which becomes stretched as taut as a violoncello string, and carries up nutriment to the little parent plant above, which drops stronger and larger and more numerous roots till it has enveloped the cotton-tree and choked it; and insects do the rest.

The Fig is considered the most useless tree in Jamaica. The bark makes a very good cordage, but there are others, the Trumpet-tree (*Cecropia peltata*), the Burn-nose (*Daphne tinifolia*), that yield a better; and by universal consent it is looked upon as the embodied principle of evil, and compared to a Scotch attorney strangling a Creole proprietor.

The bark of the two trees alluded to might become a great article of commerce. The *Cecropia* is the common weed that springs up after clearing forest-ground, it grows rapidly, and might be reared in any quantity upon land that has been exhausted by provision-crops. A person equally acquainted with the vegetation of the West Indies, might write as excellent a work upon the resources of these islands as Royle's upon the Resources of India; but such is at present the despondency and the want of capital here, that the inhabitants will not risk anything even in turning to account what they actually possess; and ship-cargoes of oranges are allowed to fall and rot upon the ground, while they fetch twopence a piece at Philadelphia and New York.

There is a small tree so common about Moneague as to bear the popular name of "*Gallimanca*," the *Guarea grandifolia*, DC., but which seems to have escaped the notice of Jamaica botanists. In its leaves I remark a peculiarity that I never saw in any other class of plants. They first appear with a few pinnæ, and continue to prolong the midrib and add new pairs of leaflets, while the first are becoming old and dropping off, till the midrib is at last left naked for a length of two and even three feet, and has in the meantime acquired such a tough ligneous structure and roundness, that, but for the facility of finding leaves in all stages, the absence of buds in the axillæ of the leaflets, the raceme of flowers at its base, and the analogy of the closely-allied genus *Trichilia*, it might be mistaken for a branch, as indeed I think it has been. It was in a *Trichilia* that I first remarked the phenomenon. After a heavy rain in February, the little shrivelled bud at the end of the leaves on some of these bushes expanded into a pair of leaflets, while the old ones dropped off, leaving the leaf in the state described by Endlicher, p. 1051, "foliis multijugis vel interdum terminali solum superstite unijugis." In examining the pinnate leaves of other trees, *Cedreleæ*, *Leguminosæ*, &c., I came upon this *Guarea grandifolia*, which presents the phenomenon in an exaggerated degree. The tree generally stands under shelter of some larger one, an *Eriodendron* or *Calophyllum*, and makes a very pretty arbour, beneath which I have often rested myself, and one that the cattle may enjoy without temptation to destroy it, for the leaves are so nauseous that none will eat them. The laths of it are used for wattling.

After a residence here of a few months only, it would be premature to attempt a detailed account of any class of plants. Dr. M'Fadyen is advancing to the completion of his Flora, and will shortly render any other superfluous.

The whole number of species is something above 3,000: one of my botanical friends here estimates it at 5,000. I have not yet actually found more than 800 in this immediate neighbourhood, but I believe these will be fully a half of all that grow here; and if this district contains a half of the whole Flora, it will come to Dr. M'Fadyen's estimate, who, speaking of Lunan's work, considers it to contain scarcely half the species. Lunan gives about 1,600. The total will probably be from 3,000 to 3,500.

Now that the passage to Jamaica is become so short and easy, it is much to be desired that botanists may often visit the island. It is doubtless the most "*comfortable*" tropical country. The Englishman finds his own language spoken, and all his usual wants provided for, and it is by no means so unhealthy as is supposed at home. In the lowlands, whatever the islanders may tell him, a stranger runs great risk of fever, as is sufficiently proved by statistical facts; but in the hills there is no such danger. Even for the lowlands there is this to be said, that there are no coughs or colds there, nor touches of rheumatism, nor any of those other minor ailments from which in the aggregate we suffer so much in England. The healthiest season there is from the beginning of December till the May rains, and the unhealthiest the autumnal months. From what I have seen, I believe the botanist will find no more convenient centre than Moneague, and it may be no feeble recommendation to him that there is an excellent inn here. The hospitality of the resident proprietors is unbounded; but every one engaged in a scientific pursuit will have felt himself more or less restrained when on a visit, and that he must of necessity have a home to work from. The temperature of 1849, in the drawing-room at Woodfield House, five miles hence, was :—

Jan.,	highest	72,	lowest	67.	July,	highest	82,	lowest	79.
Feb.	„	70	„	67.	Aug.	„	81	„	78.
Mar.	„	75	„	67.	Sept.	„	82	„	77.
Apr.	„	79	„	74.	Oct.	„	81	„	78.
May	„	80	„	78.	Nov.	„	74	„	72.
June	„	81	„	78.	Dec.	„	74	„	72.

At Moneague the day-temperature is rather higher and the night lower. Out of doors the thermometer at sunrise during April was often down to 62. Woodfield House is on an eminence, and Moneague in the valley.

BOTANICAL INFORMATION.

A List of ORCHIDEÆ *found in* ASSAM *and the neighbouring Hills.*

[Few countries in the world afford a richer field to the botanist than Assam, in Eastern Bengal, and the neighbouring Khasya and other hills, hitherto quite unexplored, save what has been done by the indefatigable Dr. Wallich or his collectors, by Major Jenkins, Superintendent of the Tea plantations in Assam, and by Dr. Griffith.

A very intelligent and well-informed collector, Mr. Simons, under the patronage of our excellent friend, Major Jenkins, now resident at Gowahatty, Assam, has already printed a list, which we give below, of the *Orchideous plants*, which he offers to cultivators on very moderate terms; and to facilitate the communication, *Messrs. Charles Cantor and Co., in Calcutta*, have kindly arranged to receive orders; and they will despatch the plants carefully to Europe, either overland, which is preferable, or by sailing-vessel round the Cape.

The price charged by Mr. Simons is fifty rupees for a box measuring three cubic feet, containing forty to fifty plants of the larger kinds, or fifty to eighty of the middle-sized and smaller kinds.—One rupee for a single plant of the common sorts. The rare and very rare in proportion.

If any *new* plants, *not discovered before*, are sent, a separate charge will be made.

A "plant" is generally composed of a bunch containing five to ten stems or more,—those with pseudo-bulbs, ten to twenty or more; and *Ærides*, *Vanda*, *Saccolabium*, and *Orchideæ* of similar growth, two or three together.

We mention this collector with the more satisfaction because he will collect other plants for cultivation on equally moderate terms; and we trust, too, that an arrangement may shortly be made with him to form large collections of dried specimens for sale among botanists. We know from experience that he is very competent to the task.—ED.]

Oberonia iridifolia, species. Liparis bracteata (Upper Assam), concinna, anceps, cylindrostachya, longipes. Otochilus fuscus, species. Pholidota imbricata, undulata, articulata, three species (new). Cœlogyne flavida, undulata, fimbriata, barbata, longicaulis, procera, cristata, rigida, Wallichiana, præcox, maculata, prolifera, nitida, ocellata, media, elata, ovalis, Gardneriana. Trichosma suavis. Bolbophyllum umbellatum, Careyanum, flexuosum, Jenkinsii. Cirrhopetalum cæspitosum, cornutum, macrophyllum. Trias,—Eria paniculata, flava, pusilla, densiflora, clavicaulis, planicaulis, ferruginea, convallarioides, spec. flowers large, rose-coloured. Aporum anceps, p.,* Jenkinsii, acinaciforme. Dendrobium Pierardi, p., heterocarpum, Paxtoni, fimbriatum, longicornu, formosum, intermedium (nov. spec.), pulchellum, nov. species, Calceolus, densiflorum, sulcatum, bicameratum, Jenkinsii, cærulescens, nobile, Gibsoni, candidum, stuposum, Cambridgeanum, clavatum, Dalhousianum, Devonianum, Farmeri, Griffithii, transparens, densiflorum (*pallidum*), densiflorum (like the preceding, but rose-coloured), multicaule, amœnum. Spathoglottis pubescens, terrestris. Arundina bambusifolia, terrestris, p. p. Phaius grandifolius, ter., Wallichii, ter., albus, ter., maculatus, ter. Apaturia senilis, ter., p. Eulophia virens, ter., p. Vanda teres, cristata, nov. spec. yellow, streaked with brown, nov. spec. dull purple. Camarotis purpurea. Micropera pallida, p. p. Saccolabium retusum, micranthum, rigidum, carinatum, calceolare, curvifolium. Sarcanthus junceus, p., affinis, p., oxyphyllus, p. Agrostophyllum Khasyanum. Œceoclades ampullacea. Ærides affine, p. p., multiflorum, p., suaveolens, p., odoratum, p., refractum, p. Xiphosium acuminatum. Acanthophippium Silhetense, ter., p. Cymbidium giganteum, lancifolium, aloifolium, p., pendulum, p., eburneum (fl. very large), inconspicuum, longipetalum. Euproboscis pygmæa. Geodorum dilatatum, ter., p., candidum, ter., p. Calanthe densiflora, ter., p. Platanthera spec., ter., p. Peristylus elatus, ter., p.,—spec., ter., p. Habenaria ovigera, ter., p.,—four new species, ter., p. Pogonia, two species, ter., p. Cyrtosia, two species, Gowahatty. Spiranthes, two species, Nowgong. Zeuxine sulcata, two species, Nowgong. Anæctochilus Roxburghii, Nowgong,—two new species, Nowgong. Cypripedium venustum, Nowgong,—insigne, Nowgong. (140 species.)

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* P., growing on the plains; p. p., partly on the plains.

Professor KOCH'S *Herbarium.*

The Herbarium of the late W. D. J. Koch, author of the admirable *Synopsis Floræ Germanicæ et Helveticæ,* is offered for sale, including duplicates. The greater portion is stated to consist of European plants, the Flora of Germany and Switzerland being of course the most copiously illustrated. The specimens are reported to be in good condition, and to form three hundred large fasciculi. The price put upon the whole is five hundred pounds. The herbarium is now the property of Dr. George Wollner, son-in-law to the late author of the Synopsis, who does not himself cultivate botany. His address is at the University, Erlangen, Bavaria.

NOTICES OF BOOKS.

M'Fadyen: Flora of Jamaica; *or, a Description of the Plants of Jamaica, arranged according to the Natural Orders, &c. &c.*; *by* James M'Fadyen, M.D., F.L.S., &c. &c.

The first volume of this really important work, including *Ranunculaceæ* to the end of *Leguminosæ,* we had occasion to announce some time ago, and to speak favourably of it. A second volume, we are happy to inform the public, will shortly appear, carrying us to the end of *Calycifloræ,* and this is printing under more favourable circumstances; for the first volume has so far given an impulse to the study of the plants of Jamaica, that besides the researches of Dr. M'Fadyen, whose long residence has rendered him familiar with the vegetation of most parts of this rich island, Dr. M'Nab, Mr. Purdie, and Dr. R. C. Alexander have made many and very important additions by their investigations, and the future pages will be rendered more complete than the earlier ones, though we are sure Dr. M'Fadyen will give an appendix of any deficiencies which existed in this first volume. We have had the privilege of seeing several proof-sheets of the present volume, and besides being proportionally richer in species than the first volume, there are the same pains taken to describe the uses and properties of the native plants. Such a book cannot fail to be welcome alike to the colonist and the scientific botanist.

Notes and Observations on the Botany, Weather, &c., of the United States, made during a tour in that country in 1846 *and* 1847. *By* Wm. Arnold Bromfield, M.D., F.L.S., &c.

(*Continued from* vol. i. p. 274.)

The very moderate heat of summer, compared with the disproportionate cold of winter, at places situated under the higher latitudes and in the centre of large tracts of land, remote from oceanic influence, is easily accounted for. During winter in these regions very little fall of any kind takes place after the snows at its beginning have descended and covered the face of the country; the sky for the remainder of the season is for the most part clear, and terrestrial radiation goes on with but little interruption from clouds or vapour for several months together, generating an extremely low temperature both of the earth and air, augmented by the intense cold brought by the north and north-east winds which then prevail. In the spring, the sun's heat is expended in freeing the earth from its covering of snow, and in thawing the superficial frozen stratum beneath it, and, from the quantity of caloric thus absorbed or rendered latent in the process, it is long ere the temperature of the soil can begin to rise above the freezing point, and heat, in its turn, the superincumbent atmosphere. During the few summer and autumn months that succeed the long and dreary winter, the greater part of the annual fall of rain takes place;* clouds more frequently intercept the sun's rays, and with the evaporation prevent the heat from becoming for any length of time excessive. Severe night frosts early in August, and which often blight the hopes of the husbandman, contribute still more to reduce the mean heat of the summers to an equality with those of western Europe. Such deeply inland regions, like the deserts of Africa and Arabia, seem fitted only for the pastoral life of barbarous and nomadic tribes, such as at present wander over them, and would require all the appliances and resources of modern science and civilization to counteract the effect of climate ere they could be rendered tolerable as the permanent home of refined and enterprising communities. The mitigated temperature of countries within the range of oceanic influence has ever shown itself one of the elements most friendly to the intellectual development and progress of our race.

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* In the heart of Siberia it is stated to rain four times more frequently in summer than in winter.

Another and equally erroneous opinion prevails, that the mean summer temperature in America is as much higher as that of winter is lower in places situated under corresponding latitudes to others in Europe. That such is not the case, might easily be shown from registers from both continents; but the subjoined examples, taken from Mahlmann's tables, giving the result of observations made at two places in Europe and America, under parallels almost precisely the same, and continued for nearly equal periods, may suffice to prove the truth of our assertions.

	N. Lat.	W. Long.	Mean temp.	Summer.	Winter.	Warmest Month.	Coldest Month.
Washington	38 53	77 1	54·86	71·06*	36·14	78·08	30·42
Lisbon	38 42	9 11	61·52	71·06*	52·44	72·14	52·16

The higher temperature of Washington during a part of the summer months is doubtless due to its much more inland position, the absence of any great body of water, and the general aridity and want of shade which makes that city a singularly unpleasant residence in the hot season. Lisbon, on the contrary, has an almost insular position at the mouth of the Tagus, and is fanned by the breezes from that river and the adjacent Atlantic, above which its elevation is also something considerable; yet we see that the heat of the entire summer coincides to a fraction at both places. So the summer-heat at Madrid fully equals that of Philadelphia, though half a degree north of the latter city and at least 1,500 feet above the level of the sea. We may here remark by the way, that even in the low latitude of Washington the winter temperature is still several degrees below that of London and Paris, whose isocheimal curves will be found to have their concave summits in southern Virginia or on the confines of North Carolina, since it is not till arriving at Richmond in the former State that we begin to find

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* Mean of summer probably too low for both places. I am far from relying implicitly on the temperatures quoted from Kämtz or Forry, which are necessarily derived from sources of very unequal accuracy, and are too often the result of a few years only of observation. Error is, indeed, apparent upon the face of many of them; but they are the best we can command, and in the main are near enough to the truth for establishing the facts here stated.

Magnolia grandiflora, Quercus virens, and the usual English evergreens common in the gardens.

Up to about the latitude of 40° or 41° the isotheral lines, or those of equal summer-heat, appear to preserve their parallelism in both continents with considerable exactness; but proceeding northward and eastward into the New England States, or westward into Canada, we find, after passing the forty-second degree,* a remarkable diminution in the mean temperature of the warmest season, which now actually begins to fall below what it is in the west of Europe under the same latitudes, whilst the rigour and duration of winter is according to the usual law of decrement more than proportionably increased, except, indeed, in the Lake district of Canada (Canada West), where the severity of winter is tempered, as we have lately seen, by the contiguity of those vast bodies of fresh water. Even there the mean heat of summer does not exceed that of London by more than 3·33°, and of the warmest month by above 4·68°, which with a difference of 8° 30′ of latitude is very little; whilst the winter is twelve degrees colder at Ancaster than in London. The subjoined table exhibits the mean temperatures of Fort Sullivan, Eastport, in the State of Maine, and Halifax, Nova Scotia, with that of Bordeaux in France—all three situated under the same parallel, and at the sea-level, or scarcely above it.

	N. Lat.	W. Long.	Mean temp.	Summer.	Winter.	Warmest Month.	Coldest Month.
Fort Sullivan......	44 44	67 4	41·72	60·98	22·28	62·96	20·76
Halifax	44 40	63 40	43·16	62·90	25·92	66·56	23·64
Bordeaux	44 50	0 34	57·02	71·06†	42·98	73·22†	41·00

Now we shall find, on taking the means of the climate of Halifax and Fort Sullivan, in latitude 44° 40′ and 44° 44′ (that of Genoa and Bologna in Italy), that the result gives us very nearly the climate of Stockholm in Sweden, latitude 59° 21′, as given in a former table.

	Mean temp.	Summer.	Winter.	Warmest Month.	Coldest Month.
Halifax and Fort Sullivan..............	42·44	61·94	24·10	64·76	22·20
Stockholm..........................	42·08	60·98	25·52	63·68	23·90

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* Even already at Boston, lat. 42° 21′, the mean heat of summer scarcely reaches 70°, Fahrenheit (68·90, Mahlmann), two or three degrees less than on the west coast of Europe under the same parallel.

† Summer temperature probably a little too high for the rest of France in that latitude.

Hence it follows, that, to speak in round numbers, we find on the eastern coast of America, in lat. 45°, the same mean annual temperature as on the western shore of the Baltic in lat. 60°, with a coincidence scarcely less remarkable in the heat of the other four epochs.

Advancing still further north along the east coast, the climate becomes rapidly worse, and at St. John's, Newfoundland, lat. 47° 34′, west long. 52° 38′, the mean temperature for eight years, by a set of observations in my possession, made with great apparent care, is only 39° 29′, or about a degree above that of St. Petersburg, whilst the mean of summer is considerably below that of the same season in Edinburgh, lat. 55° 56′, as will be evident from the following results from Mahlmann's tables, and which nearly coincide with those just mentioned.

	Mean temp.	Spring.	Summer.	Autumn.	Winter.	Warmest Month.	Coldest Month.
St. John's........	38·30	31·64	53·90	43·70	23·18	57·92	20·84
Edinburgh........	47·48	45·68	57·92	48·02	38·48	59·00	37·22

A more wretched climate than this of the southernmost part of Newfoundland could hardly be conceived to exist in so low a latitude (that of the south coast of Brittany), being, in fact, but little better than at Reikiavig in Iceland, lat. 64°, the winter at St. John's being more severe, and the summer scarcely at all warmer than at that place. The quantity of ice I remarked lying unmelted on the shore of this inhospitable island, near Cape Race, in the middle of July, speaks, as forcibly as any register can do, of the low temperature there prevailing.

Many other proofs, besides those given above, might be adduced, to show, that beyond a certain point the summers of America, towards its eastern side at least, are less warm than in Europe under like parallels; that the heat is also less prolonged, and frequently interrupted by cold rains and night frosts; that the springs are as late as in the north of Europe, but the autumns longer and drier,—which season is, indeed, for the most part, as with us, the steadiest and most agreeable of the year in America.

With such a rapid deterioration of climate as these tables demonstrate to take place betwixt the parallels of 40° and 45°, both in the summer and winter temperatures, the extraordinary difference in the nature and aspect of the vegetation of Pennsylvania and Maine no longer excites surprise, and we can well understand why, in the short space of three or four degrees of latitude, we lose in quick succession the following native and cultivated trees and shrubs, which already enrich the Flora or adorn the gardens of Philadelphia, and are, for the most part, not uncommon, native or domesticated, in the vicinity of that city (lat. 39° 58′ N.)—*Magnolia glauca*, *Quercus phellos*, *obtusiloba*, *nigra*, *falcata*, and *Chingnapin*, *Morus rubra*, *Liquidambar styraciflua*, *Liriodendron tulipifera*, *Diospyros virginiana*, *Cercis Canadensis*,* *Castanea pumila*, *Catalpa cordifolia*, *Gleditschia triacanthus*, *Ailanthus glandulosa*, *Andromeda Marviana*, *Kalmia latifolia*, *Cornus florida*, *Sassafras officinale*, *Asimina triloba*, and many others. Within less than twenty degrees of latitude, climates of tropical fervour and arctic severity succeed to one another with incredible rapidity in eastern America, and an interval of a few hundred miles is all that separates regions bound up for half the year in thick-ribbed ice from the cotton and rice fields and the sunny "sea islands" of Carolina and Georgia, crowned with the orange and palmetto, and where ice is at all seasons a luxury almost indispensable.

Montreal, Sept. 24.—Arrived here from Hamilton, *viâ* Toronto and Kingston, after a delightful passage, during which the surface of Lake Ontario was scarcely disturbed by a ripple, the sky nearly unclouded, and the temperature, even at this late season, delightful all day, and even after sunset. Toronto, where I spent an hour or two, is the finest town I had yet seen in Canada, built quite in the American style, with wide streets and handsome stores. The Locust is the favourite tree in the gardens and public places, and with the Lilac thrives well and attains a large size, but the *Catalpa*, *Broussonetia*, and *Ailanthus* have quite disappeared. A miserable rainy day to the close, cold, dark, and comfortless, greeted us on landing from the steamer Prince Albert, at La Chine, a miserable wooden town, but enjoying a considerable trade, and from which myself and fellow-passengers proceeded in a set of antique lumbering vehicles for the quondam capital of Upper Canada, which we reached about ten A. M. Betwixt La Chine and Montreal I observed *Artemisia vulgaris* abundant along the fences.

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* I believe this tree does not grow in any part of Canada, nor in a wild state beyond lat. 41° in the United States.

Vitis ——? I believe *V. Labrusca*, the commonest species in the States. The Virginian Creeper (*Ampelopsis quinquefolia*), and Waxwork (*Celastrus scandens*), were frequently seen climbing over the fences and bushes. An *Amaranthus*, common in the States, grew abundantly in waste grounds, and *Rhus typhina* appeared for the second time since landing in America, frequent as a bush or small tree. Apple-orchards are everywhere numerous about Montreal, and the trees, which were remarkably healthy and well grown, were absolutely bending under the weight of a superabundant crop of fruit. The principal kind of apple grown here is known as the *Pomme-Neige*, from the snowy whiteness of the pulp; it is also called *La Fameuse*. It is a large apple of an intense purple-red all over, with here and there only some spots of green, curiously contrasting with the extreme whiteness of the interior, and, unlike most ruddy varieties of this fruit, is as valuable for its brisk flavour and juiciness at the dessert-table, as for baking or boiling; but it does not keep well. The situation of Montreal on an island of the St. Lawrence is very pleasing: if it wants the picturesque site and quaint architecture of Quebec, it is infinitely superior to that city in cleanliness, spaciousness of its streets, cheerfulness of aspect, beauty of its public buildings, and, above all, in its climate. All the trees indigenous to the provinces of Upper and Lower Canada, excepting Chestnut, Sassafras, and perhaps one or two others that flourish only in the mitigated climate of the Lake district, attain their full stature about Montreal; but most of the arborescent plants more properly belonging to the United States Flora, succumb here to the rigour of winter, or remain small and stunted. Mr. M'Cord, of Temple Grove, tells me the Tulip-tree (*Liriodendron tulipifera*), is killed back to the root every winter at his residence, and that the same thing happens with the common Laburnum of Europe. I saw a few tolerably thriving Plane or Button-wood trees (*Platanus occidentalis*), but they were evidently rare, and only in gardens. The Locust-tree still grows in this latitude, but Mr. M'Cord informs me that on arriving at the age of about twenty years, they die off, from some unknown cause, like the Peach in the United States. At Montreal this fruit requires the shelter of a wall and some covering in winter. About twenty years back, I learn from the same gentleman that melons could be raised here abundantly, as in Upper Canada, but since then, until the present very early and extraordinary warm summer, their cultivation has been abandoned from deficiency of seasonable heat.

My first visit to Montreal, from the 24th to the 26th inclusive, was marked by continued dull, chilly, foggy, and rainy weather, with an equinoctial gale, not at all answering to my anticipations of the calm and clearness of a Canadian autumn. This state of things, however, was not so bad as to confine me within doors, and I sallied forth on the 25th to explore the mountain, a high round-topped hill, or rather a group of parallel ridges overlooking the city on the N. and N.W., and affording charming views of the surrounding country and the noble St. Lawrence. On the way thither I observed a few plants of Henbane (*Hyoscyamus niger*), and amongst some potatoes *Euphorbia helioscopia* grew plentifully, but appeared slightly to differ from the common European form of the species. *Lithospermum officinale* was also common in pastures and waste places. The trees have as yet put on but little of the livery of autumn, the leaves being but slightly and partially discoloured, only showing the worn rusty aspect that precedes actual decay. The lower part of the Montreal Mountain is an open grove, the trees standing detached without the least underwood; higher up, the soil is more rocky, the sides very steep, and covered with a rich vegetable mould and loose fragments of rock, producing a considerable undergrowth of shrubs, herbaceous plants, and ferns. The timber on the mountain, like that all around Montreal, consists almost entirely of hard-wood trees, a very few Hemlocks (*P. Canadensis*) here and there, with an occasional white or Weymouth pine (*P. Strobus*) excepted. Those at the base are chiefly Bass-wood (*Tilia glabra*), one of the most prevalent species in the north, Wallnut (*Juglans cinerea*), Hickory (*Caryæ sp.*), Sugar-berry (*Celtis occidentalis*), rare, only one specimen observed, but that one of considerable size. This tree must here have nearly reached its polar limit. Sugar Maple (*Acer saccharinum*) of fine size and height, and, next to the Bass-wood, the most abundant forest-tree hereabouts. The Red Oak, *Quercus coccinea,* was the only species I found of this genus. A little higher up the hill, where the ascent becomes steep and stony, the Moose-wood, *Acer pennsylvanicum,* with its ample three-lobed leaves, much like those of *Rubus odoratus,* and prettily striped bark, first made its appearance as a low slender tree or large shrub. Associated with the foregoing were the Iron-wood (*Ostrya virginica*), Hornbeam (*Carpinus Ameri-*

canus), Great Aspen (*Populus grandidentata*), frequent. This sometimes occurs here with leaves as small as in the common American Aspen, *P. trepida* (surely Michaux's name of *tremuloides* is inadmissibly barbarous), and some of them approaching those of the latter in shape: it appears to me probable that both these presumed species may be forms of one and the same tree, differing much in the same way that our European Grey Poplar and Abele (*P. canescens* and *P. alba*) do from each other, which I have long suspected are not truly distinct, since I can never find any constant character between them. The Beech (*Fagus ferruginea*), and a species of Birch, were also frequent, and on the crest or summit of the mountain a few *Pinus Strobus*, which does not show itself lower down. As under-shrubs I noticed *Cornus circinatus*,* abundant; *Cornus stolonifera*; Hazel (*Corylus Americana*); *Cratægus*, two or three species, one with yellowish fruit; *Dieuvilla trifida* (*D. Canadensis*, Muhlenb.), plentiful and in ripe fruit, which, in all the specimens I examined, was distinctly 4-celled. A species of *Sumach* was not uncommon here and in the plain below, answering to *R. glabra* in size and smoothness of the leaflets, but the young shoots and common petioles were downy. The much larger and arborescent Stag's-horn Sumach (*R. typhina*) abounds in the neighbourhood of Montreal, and seems on the whole more of a northern than a southern species, as I seldom remarked it prevailing to any extent in the middle section of the Union. Of herbaceous plants observed on the mountain at this my first and during my second visit to Montreal, the lateness of the season prevented me from noticing more than a very limited number. *Menispermum Canadense* was remarked climbing over trees in one or two places, but no fruit seen. *Amphicarpæa monoica* trailed frequently over low shrubs. *Smilax herbacea*, common, climbing over bushes, and now exhibiting its bunches of bluish-black berries. *Polygonatum pubescens*? sparingly seen in fruit, the berries large, black, with a bluish glaucous bloom, coming very near, as does the whole plant, to our Solomon's Seal (*P. multiflorum*) (*Convallaria multifl.*, L.); *Smilacina racemosa*, not unfrequent in fruit, which resembles small red currants. I also found what I have little doubt was *S. stellata*, with clasping leaves, but the fruit which I have seen in Pennsylvania had dropped from the specimens. *Helianthus decapetalus* abounded, all the heads were rayless: are the rays deciduous, or sometimes wanting in this as in many other *Compositæ*? *Clematis virginiana*, *Apocynum androsemifolium*, a species of *Lonicera*, and many Ferns, were remarked,—amongst the latter the common but beautiful *Adiantum pedatum* was unusually fine and abundant.

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* The American species of *Cornus* are very imperfectly defined, and difficult to make out by descriptions. The shrub I take to be the true *C. circinatus*, and which I find a very common species in this neighbourhood and the Lake district, is remarkable for its very divaricate branches, roundish ovate opposite leaves, that are whitish and finely tomentose beneath, with erect pubescence, stem and branches yellowish-green and warty, the young wood of the same colour, not red, as in *C. stolonifera*, the cymes (in fruit) divaricately compound, nearly hemispherical, fruit white, or partially lead-coloured, as in *C. stolonifera*.

Quebec, September 27th.—Arrived here in the fine steam-boat Montreal, in eighteen hours from the latter city, having been forced to lay-to near Trois Rivières, on account of the fog. The weather to-day was very unfavourable for seeing the country we were traversing, the morning very dull and overcast, with a great deal of rain during the day, the air extremely damp, chilly, and disagreeable throughout. The banks of the St. Lawrence on each side are bold, rocky, and for the most part beautifully wooded, for a long way above Quebec, and nearly to the city itself, beyond which the country becomes flatter, less wooded, and fertile. The timber, as far as could be judged of from the vessel as we shot rapidly down the river, appeared of medium size, with single trees of apparently large dimensions, for the most part hard-wooded or deciduous, but at intervals clumps or entire groves of pine crowned the elevated banks, seemingly Hemlocks (*Pinus Canadensis*), and probably the Weymouth Pine (*P. Strobus*), which here finds a congenial climate, and is very common about Quebec. Near the city, at Carouge, and at the Coves, the river-banks recede into deep and richly-wooded hollows of great beauty, and of a luxuriance I did not expect to find in this ungenial latitude. The trees were all of the hard-wood kind, and their foliage showed more of the fading tints of autumn than at Montreal, although on the whole still pretty fresh and green.

For magnificence of situation Quebec has perhaps few equals; but accustomed as I had been to the gayer architecture and busier aspect of American towns, there was to myself an air of gloom and desertion about the place which the miserable state of the weather was ill fitted to dispel. The streets are wretchedly narrow, crooked, and dirty, and the steep ascent from the old to the new town is by flights of steps, covered with mud in wet weather, and with refuse at all times. The odd old-fashioned grey houses, with their high-pitched roofs, have a picturesque quaintness about them, but a quaintness of the commonest kind, since there is neither richness nor variety of architectural detail in these pseudo-antique abodes, as in the really old towns of France, which Quebec resembles, chiefly in their worst features and inconveniences. The public buildings—chiefly churches and convents—are absolutely hideous, both in design, and from being in most instances incased, side-walls as well as roofs, in plate armour of tin, which has the unlucky effect of snow on a dull day, recalling, in the midst of the fleeting summer, the unwelcome images of a seven months' winter. Most of the private dwellings are thus roofed, if not wholly covered with tin, the advantage of which over slates, tiles, or shingles it is not very easy to see, as, though said to be durable, the cost in the first instance must be considerable. The reflection of the sun's rays from so many polished tin plates must be very annoying on a bright day, but Phœbus considerately spared me the pain of recording this amongst my other objections to the ancient capital of Lower Canada from personal experience, by scarcely once shining out during my stay in the town. The few hotels in Quebec (of which Payne's is the principal) are very indifferent establishments, contrasting most unfavourably with the excellent ones at Montreal. The city had not recovered from the calamitous fire which a year or two before had laid waste a great part of it; the blackened walls and ruined masonry had in a few spots only been partially cleared away. The population I thought looked squalid and listless, nor did I see a single good shop in the town. Everything bespoke stagnation and apathy since the removal of the seat of government to Montreal, for the trade of Quebec is carried on at the Coves, a little lower down the river.

Journal of an Excursion from SANTAREM, *on the* AMAZON *River, to* OBIDOS *and the* RIO TROMBETAS; *by* RICHARD SPRUCE, ESQ.

(*Continued from p.* 276.)

I had observations to-day for time and latitude: there was too much wind to make use of a plate of water as an artificial horizon, but the river was wide enough to answer my purpose. A meridian altitude of sun gave for latitude of the Sitio of Santa Cruz 1° 37′ 34″ S., assuming the river to be one mile broad; but if the breadth is only three-quarters of a mile, the latitude should be 1° 37′ 10″ S.

Senhor Angelo's feitor, who, as above stated, accompanied me into the forest, I found to be a very intelligent person. He had lived many years on the Trombétas, and was perfectly familiar with the whole of the river, as well as with its tributaries. I wrote down from his mouth the following list of lakes and igarapés,* the waters of which enter the Trombétas on the right and left, in *ascending* from the mouth of the Cuminá. The names and positions of all these lakes were confirmed by our pilot, who had also had frequent opportunities of becoming acquainted with them.

(Note : L. signifies a large lake ; *l.* a small lake.)

(On left.)	TROMBETAS.	(On right.)
Carimú, *l.*	——	Aracuáo, *l.*
Samaüma, *l.*	——	
	——	Bacabál, *l.*
Acarí, *l.*	——	
Batátas, L.	——	
	——	Muçurá, *l.*
	——	Adjudante, *l.*
Múra, L.	——	
	——	Jauarí-pecú, *l.*
Aqui fica a primeira praya chamada de Gaivota	——	Jaquirí-assú, L.
	——	Jaquirí-mirí, *l*,
	——	Maincué, *l.*
Curuçá, *l.*	——	Curuçá, *l.*
Tapají, *l.*	——	Praya grande de Léonardo.
Fariâ, *l.*	——	
	——	Jacaré, *l.*
Uabuí, L.	——	

(Na boca deste ultimo rio fica a praya de Uabuí, a mayor de todas as prayas do Trombétas.)

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* *Igarapé*, or more correctly '*Ygarapé* (from '*ygára*, a canoe, and *pé*, a way), is a term applied by the Indians to all streams which will admit the passage of a canoe.

The above list does not include the small riachos, which fall here and there into the river, nor some insignificant lakes nearly dried up in summer. There are also other smaller prayas resorted to by turtle, but the three above-named are the principal ones. Above the Lago d'Uabuí, the largest of all the lakes of the Trombétas, commence the cachoêiras.

From the testimony thus obtained, as well as from other sources, I am convinced that no large river enters the Trombétas above the Cuminâ and Aripecurú; and that the "Cupo" and "Saraguata" laid down in Martius's map as entering it from the east, are purely imaginary. Even the names are quite unknown to the dwellers on the Trombétas. The great map of Spix and Martius is, however, the most perfect I have seen for the bason of the Amazon; and the direction of the Trombétas near its embouchure, is more correctly given in it than in the map of the Useful Knowledge Society. In ascending the Trombétas our course was nearly due west for at least thirty miles, before there was any decided trending to the north.

The igarapés entering the Trombétas above the Cuminá are said to all expand into lakes a little way from their embouchures, and the feeders of these lakes would appear to be all slender streams, though some of them, as my informant said, "vao longe pelo centro."

January 3.—We spent the night at the Sitio of Santa Cruz, and it was a great luxury to sleep once more under the shelter of a roof. This morning started with strong and fair wind, and with current in our favour. A little before midday we reached our former halting-place at the mouth of the Iripixy, and I devoted a few minutes to a meridian observation of the sun, which gave for latitude 1° 48′ S. Shortly afterwards the wind dropped; very heavy showers came in rapid succession, and found out a weak place in the roof of our tolda. No dry paper to-day. Grievous to have plants turning mouldy under one's eyes, and no help for it! It is astonishing how soon specimens spoil in this hot and moist climate if not carefully attended to, but on the whole we have been very successful, and most of my specimens will bear comparison with any I have dried in Europe. At half-past seven, P. M., reached Sitio de Quiriquiry, our first stage from Obidos.

January 4.—Spent last night with our old friend Elisardo, and was much interested to fall in with a gentleman on his way up the river to his residence within the Sapucuá, who informed me that two years ago he went up the Aripecurú to seek Salsa, and that he and four companions resided above a month near the third cachoêira. This was in the month of September, when the weather was fine, the mato dry and less grown up with rubbish than now. They took only farinha with them, for then the woods were full of game, and they fared well; ascended the river much higher than we did—passed (he says) twenty-six cachoêiras, in which, however, he includes places where the river merely runs rapidly among rocks. The Serra de Carnaú is densely covered with mato; we therefore probably lost nothing in the way of plants by not ascending it. He never heard of the Serra d'Acarai, but from the description I gave of its position has no doubt the Serra de Carnaú belongs to the same group. The river passes to the westward of the highest point of the serra, forming some considerable falls over the shoulder which I had remarked. At the highest point he attained, the river still continued to descend from the north—its volume diminished, but its breadth the same. About half-way up the cachoêiras enters an igarapé, coming from the east, on the banks of which he collected much Salsa. He did not encounter any stream running northward.

This account made me deeply regret that I had not had a more favourable season for exploring this interesting river; but when I left Obidos every one seemed confident of my having at least a month of dry weather before me; for the dry season had commenced late and was expected to be prolonged until the end of January; whereas we afterwards learnt that the rainy season set in furiously along the whole of the Amazon on the 20th of December, and when we returned to Obidos the river had so gained on its banks that we hardly knew them again.

I waited until noon in order to dry our paper and get a meridian observation of the sun. This gave for latitude 1° 54′ S. We started with a strong wind in our teeth, but certain on reaching the Amazon to have the assistance of a rapid current.

January 5.—Reached Obidos yesterday at ten P. M. This morning went on shore to embark the articles left there, and buy a few eatables, for I had Major de Gama's permission to take the canoe and men through to Santarem. I was so foolish as to give the men money, on the plea of buying materials for clothing; the consequence was that they all got a thorough lining of cashaça, and the pilot was worse intoxicated than any of the rest. Embarked at half-past eleven, in the face of a strong wind and heavy swell. Storms are more dreaded in this part of the Amazon than in any other.

January 6.—Yesterday our tipsy men allowed one of the moveable toldas to be carried away by the wind—then the sail broke loose—we shipped some seas and were nearly upset. Still, by tacking from one side of the river to the other, and aided by the strong current, we made excellent headway, and kept going all night. A little after one A. M. a tremendous trovoádo arose—the wind swept furiously over the water, and soon lashed old Amazon into a tempest. We were in the middle of the river, and ran for the island of Marimaritúba, which has a low shore with a praya, now covered by water. Upon this we grounded, took down our sail, and lay thumping about among willows, until the force of the storm had passed.

This morning we landed on the isle of Marimaritúba to gather the Arrow-plant (*Arvore de frêcha*, Portug., '*U'yoa*, Bras.), one of the most magnificent of grasses, whether growing singly or in masses. It grows erect to the height of from fifteen to twenty feet, and sends forth about five arched buttresses on each side, the uppermost leaving the stem at about three feet from the ground, and rooting at the same distance. The leaves, which occur only in the upper third of the stem, are distichous, sometimes so closely placed as to be equitant. The panicle is often four or five feet long, with myriads of minute flowers of purple and silver, turned to one side, slightly drooping, and waving gracefully with every breath of wind.

We reached Santarem at half-past six P. M., having been only thirty-one hours in coming from Obidos, although with unfavourable winds throughout. But the Amazon, which it sometimes costs so much to ascend, can with ease be descended, at any season of the year, and especially after the rains have set in.

(*To be continued.*)

Extract of a letter from J. ELLERTON STOCKS, M.D., F.L.S., &c., *Assistant-Surgeon on the Bombay Establishment, Inspector of Forests in Scinde; dated*

Kurrachee, 6th of July, 1850.

My second Beloochistan trip has been interesting enough, and I shall be able to send you three hundred plants not previously seen by me, which, with two hundred sent formerly, will make five hundred for the Beloochistan Flora as yet observed. Of course a resident in the country would double this number; but this is as much as could be expected from flying visits. Nor need I grumble, for I have just got, in three months' easy work, what it took me more than three years to gather in Scinde Proper. But I had expected six hundred species from this last trip alone. You will have many of Griffith's plants, though better specimens, inasmuch as Griffith was cramped by moving with an army through a hostile country, where it was madness to stir two hundred yards from camp. Hence, he had to depend on collectors, besides having only scanty carriage at command. Seeds, roots, bulbs, gums, fruits, and specimens of woods, will accompany the dried specimens; and I think you will find some of the seeds and bulbs to produce really pretty plants.

If you will follow me in the map prefixed to Thornton's Gazetteer of the N.W. countries, you will see I traversed plenty of ground. From Shikarpoor to Gundava (300 feet), and thence by the sweep of the Gundava pass (Peer Chutta, Kohoo, Nurd, &c.) to Peeshee Bhent, 3,300 feet above the sea. Thence, leaving the pass, to the open plains of Zehree, 5,000 feet, where the Brahnico-Affghan vegetation began, and thence through Nograma, Panduran, and Nichara, to Kelat. Thence to Zyrant, Ghurruk, Pundee, Zurud (all these names are thus abominably mangled on the map), and thence three marches direct west towards Nooshky, on a pilgrimage in search of the Assafœtida plant. Having made prize of a sufficiently odoriferous *Ferula*, which "if not Bran, is Bran's brother," I sloped off N.E. to Kunuk and Karez, above Moostung in the map, and just below the parallel 30°. Here I ascended Chehel Tun, which is the elongated mountain between Karez and Siriab. Thence to Burg, Ispunglee, Quetta. Thence, retracing my steps, to Siriab, Teeree, and Moostung. Thence, a *détour*, through Ispinjlee, Johan, and Kishan, on the Rodbahar route from the Bolan Pass to Kelat. From Kelat homewards to Kurrachee, by Rodinjo, Sohrab, the Zawa Pass (where ended the upper vegetation), Khozdar, Wudd, Bela, and Sonmeanee.

From Shikarpoor to Kurrachee, between the 18th of March and 25th of June, I made sixty-eight marches, and got over six hundred and sixty miles of ground with great satisfaction, though laid up regularly every fortnight, and sometimes in the intervals, with the attacks of the demon ague, which has never left me since I made my first raid into Beloochistan in 1849.

To speak roughly, the collection will chiefly illustrate the Flora of the parallelogram bounded N. and S. by the parallels of latitude 28° and 30°, and E. and W. by the meridians 66° and 67°; in which space the plains are generally from 5,000 to 5,500 feet *supra mare*, though occasionally, as at Kelat and Kapota, rising to 6,500 and 7,000 feet respectively. The Boundary-hills rise 500 to 1,000 feet above the plains; and the giant Chehel Tun, 5,000 feet above the plain, or 10,500 above the sea, had, at the time of my visit (May 4th), its peak streaked (as with written characters) by deposits of snow in its N. and N.W. ravines. In this space is seen the perfect or fully-developed Brahnico-Affghan flora, marked by vast plains (generally long and narrow; the boundary hills running parallel at a distance of two or three miles) covered by *Wormwood*, among which, in the spring, *Tulips*, *Fritillaries*, *Anemone*, *Delphinium*, and *Iris*, with small *Boragineæ*, *Cruciferæ*, *Compositæ*, and *Leguminosæ*, spring up quickly and wither incontinent; while, on the lower hills and along their bases, gummy *Feruloid Umbelliferæ*, *Rhubarb*, *Acantholimon*, *Acanthophyllum*, *Salviæ*, *Perowskiæ*, *Amygdali*, *Ephedra*, *Pistachia*, *Daphne*, *Fraxinus*, *Ebenus*, *Spiræa*, *Jaubertia*, *Gentiana*, *Onosma*, *Paracaryum*, *Arnebia*, *Eremostachys*, *Convolvulus*, *Campanula*, *Hurmul*, *Haplophyllum*, *Linum*, and such like occur, with the *Juniper*, the *Sweet-briar Rose*, and the "*Forget-me-not*," marking the higher elevations.

But, although the most common and characteristic vegetation may be seen in the vast and monotonous plains of *Artemisia*, yet, in peculiar localities, other plants and a different arrangement of the Flora give diversity to the scenery. 1. There are, towards Pesheen, salt-plains cut up by steep-banked watercourses fringed with *Tamarisks*, which trees, as well as the surface vegetation of *Salsola*, *Arenaria rubra*, *Nitraria*, *Halocharis*, *Crypsis*, *Tetradichlys*, give evidence as to the soil, even were that not covered by snow-like patches of salt, crisp underfoot, and hurtful to the eyes. 2. On the slopes of the higher mountains, often very gradual and projecting far from the steeper parts, the Pistachia-trees growing very fine and luxuriant, give almost a forest character to the scenery. Associated with them are the Ash, *Daphne*, and Wild Olive. 3. Very peculiar was the aspect of the vale of Johan, where only (nor could the natives say positively that it is to be seen elsewhere) I found the Myrtle, forming all over the valley small groves or thickets, close-set and entangled, delightful from the dark-green hue and fragrant smell of the leaves. 4. The vegetation of the *Corn*, with Pheasant's Eye, Blue-bottle, Corn-Poppy, Venus's Comb, *Leontice*, and *Bongardia*; and the rank herbage of the little brooks, such as Willow-herb, Mint, Brooklime, Celery, with *Myriophyllum*, *Chara*, *Potamogeton*, and *Sium*, were striking, indeed, and peculiar, but do not occur sufficiently in mass to influence the landscape.

Distinct from this ("Griffith's Province") is the vegetation of the passes, bare rocks, open valleys, and lower hills, from 5,000 feet downwards, which Griffith saw in the Bolan and Khyber passes, and which I have noticed in the Gundava, Rohill, and Hurbab passes, in the Rodbahar valleys, in the road from Wudd to Bela, which includes the short pass called Barun Luk, and along the desolate Kafila route from Kurrachee to Khozdar in Lower Beloochistan. *Boucerosia Aucheri*, *Capparis aphylla*, *Tecoma undulata*, *Periploca aphylla*, *Convolvulus spinosus*, *Lycium Europæum*, *Acanthodium spicatum*, *Prosopis spicigera*, *Rhazya stricta*, *Puneeria coagulans*, *Indigofera pauciflora*, *Zizyphus Jujuba*, *Grewiæ*, *Salvadora oleoides*, *Ochradenus baccatus*, *Calotropis procera*, *Caragana polyacantha*, *Catha*, *Vitex bicolor*, *Gaillonia eriantha* and *hymenostephana*, *Physalis somnifera*, and *Achyranthes lanata*, are the never-failing characteristic plants, while *Euphorbia neriifolia* and *Chamærops Ritchiana*, though natives of this region, yet fail unaccountably over whole tracts of country. Thus the *Euphorbia neriifolia* is only found in the districts which pour their waters into the Hubb and Pooralee rivers, and the *Chamærops* only in the districts of the Hubb, Pooralee, and Gaj rivers. Neither is found in the Bolan or the Moola (*i.e.*, Gundava) Passes, which is curious.

The two vegetations here noticed, though distinct enough at 5,500 and 4,000 feet respectively, yet intermix between 5,000 and 4,500 feet. The plants of the lower region which ascend the highest are *Otostegia Aucheri* and *Pycnotheca spinosa*. Those of the higher region which descend lowest are *Ebenus stellata*, a *Dipsacus*, a pretty

Sophora, *Passerina*, *Callipeltis*, *Salvia Palæstina*, and the common weeds of the corn-fields, such as *Ranunculus arvensis* and *muricatus*, *Achillea*, *Santolina*, *Scandix pinnatifida*, *Notoceras Canariense*, *Hyoscyamus micranthus*, *Anchusa hispida*, &c. There is a *Convolvulus* very common in both regions, a spiny bush; but it is the *Conv. spinosus* below 5,000 feet, and, above that, a distinct species. In like manner the *Eremostachys laciniata* of the lower region is replaced by the *Eremostachys superba* and *thyrsoidea*.

The upper region is remarkable for the fragrance of its plants, as *Artemisia*, *Perowskia*, *Salvia*, *Teucrium*, and other *Labiatæ*, from which cause the flesh of the sheep and goats acquires a fine and almost aromatic flavour. Bulbous plants appear in great variety during March and April. There is no nakedness of the soil, for hill and plain are alike covered with depressed shrubs, although their scorched aspect, after the sun acquires power in June, is anything but agreeable to the eye. The prevailing tint of the vegetation and of the landscape is olive-green, I mean in the uncultivated plains, for the well-cultivated valleys (as Quetta) are charmingly green in the spring-time, and Moostung has its orchards extending three miles in length—a noble sight.

Far different is the lower region and the aspect of its plants, few, and scattered over the bare, brown, and stony soil. Even in spring no annuals appear to diversify the scenery, and the undershrubs are remarkably similar in external appearance. Woody, stunted, thorny, not above a foot high, with round, cushion-like outlines, bleached stems, and a few leaves, they look like skeletons of plants, the grey ghosts of a vegetation which has perished of thirst. The glaucous aspect of all, and the universality of spines, are remarkable. Petioles, leaves, midrib, stipule, branches, bracts and calyx, are (some in one case and some in another) stiff and prickly. The *Euphorbia neriifolia*, *Caragana polyacantha*, *Convolvulus spinosus*, *Fagonia Arabica*, *Acanthodium spicatum*, *Otostegia Aucheri*, *Pycnotheca spinosa*, *Lycium Europæum*, *Prosopis spicigera*, *Acacia Farnesiana*, *Acacia rupestris*, *Asparagi sp.*, and many Tragacanthine or thorny *Astragali*, present every variety of sharp and repulsive spines; while *Capparis aphylla*, *Periploca aphylla*, and a bushy *Salsola*, with their stiff rod-like leafless stems, fill up the measure of as desolate and offensive a vegetation as can be imagined. Even in the watercourses the stiff-leaved Fan-Palm and the rigid Tamarisk (a decandrous species with foliage rough to the touch, and not feathery as in the common kinds) are conformable to the general appearance. This is the camel's region, for on these plants, almost unapproachable from their hedgehog-like armature, the camel feeds with a relish which shows that these spines, prickles, and thorns act only (like pepper and capsicum to us) as a gentle fillip to his digestion. But in this lower region there are exceptions to the prevailing sterile aspect. There are little valleys (such as Shah Bilawul in the Dubb mountains) where a spring of water will have encouraged a more profuse vegetation. Here and there, too, will be found a valley thickly covered with the *Populus Euphratica,* and these have received from the natives the name of Putkee, from the Bráhnic name of the tree. There is one Putkee in the Moola or Gundava Pass, and another on the road between Khozdar and Wudd. The vale of Wudd, too, is very thickly covered with a sub-forest of *Tecoma undulata*, one of the most beautiful of trees when in full flower. I send you good seeds. It will flower when eight feet high, and indeed often when a mere bush. *Tecoma glauca* (Decaisne in Jacq.) is only a synonym.

So much for the indigenous Flora of Beloochistan *in the rough,* inasmuch as I have yet to go over the plants with the aid of books, which cannot be carried on these expeditions.

The articles of cultivation in the upper region are, Wheat sown in autumn, left to be snowed over, and reaped in summer; Barley; Lucerne and Clover; Madder; Peas and Tares. In the lower region, Wheat and Barley, with the addition of Millet (*Sorghum*), Rice, and Cotton.

Again, the fruits of the upper region are Apricot, Peach, Plum, Pear, Apple, Almond, Wallnut, Mulberry, Quince, Grape, Fig, Pomegranate, *Celtis*, and *Elæagnus,* planted thickly in orchards and mixed with Willows and Poplars.

The fruits of the lower region are Mulberries, Apples, Grapes, and Figs, with very inferior and scanty Apricots, very good Pomegranates, and excellent Dates. This last is the characteristic fruit. It does not grow above 5,000 feet, for it cannot stand the snow and rain of the upper region. "Caloris avida est, et frigidum ferre nequit" (Theoph.). A station in the Bolan is called Sir-i-Khujoor from being the limit of the Date in that direction. It is about 4,500 feet above the sea. It does not grow at Quetta or Candahar, or indeed anywhere, except it can get a hot dry atmosphere. The Pomegranate is a more accommodating plant, for it produces good fruit under very different climates;

and cuttings from a superior kind of Pomegranate would probably produce good fruit in most parts of the sub-tropical zone. It does not seem to succeed in the tropics; but perhaps the only eatable variety, that with abundant *red* pulp and soft seeds free from grittiness, has never been introduced. The Pomegranates of Jellalabad are proverbially excellent, in latitude 34° 25′, at a height of 2,000 feet, below the snow region, and in the lower region, as denoted by the *Calotropis procera*, *Rhazya stricta*, *Ærua lanata*, and *Zizyphus Jujuba*.

Equally good are the Pomegranates of Kirani, near Quetta, at a height of 5,700 feet, in latitude 30°, where snow is plentiful, and the winter very severe. The Pomegranate grows both at Kabul and Kelat, but its fruit is not esteemed. It is said that there are first-rate Pomegranates, red-seeded and pulpy, at Jodpoor in Marwar, in latitude 26°, at the edge of the Great and Little Deserts, in a sandy soil whose characteristic plant is *Acacia Arabica*; and it is well known that the Pomegranates of Mekran, and of the hot countries bordering the Persian Gulf, are first-rate in quality. Very excellent, also, are the red Pomegranates of Khozdar in Beloochistan, in 28°, at a height of 4,000 feet, and just out of the upper or snow region. The disparity in climate between Kirani near Quetta and the hot countries bordering the Persian Gulf, must be great indeed; for vast is the difference between Kirani and Khozdar, or Kirani and Jellalabad, or Kirani and Jodpoor, or Kirani and Mekran. Yet in all grows the Pomegranate called Bédaná, or seedless, with abundant red pulp, and seeds free from grittiness. But I dare say you would sooner have the tangible evidences of the nature of the Beloochistan Flora than a mere account,—sooner have the plants between paper than on paper. So I will set to work at once and arrange them, so as to send them off as soon as the port of Kurrachee opens after the monsoon.

Appendix to the 'SPICILEGIA GORGONEA,' *published in the* 'FLORA OF THE NIGER EXPEDITION'; *by* P. B. WEBB, ESQ.

Since the publication of the Niger Flora, a French naturalist, M. Bocandé, has sent to Europe a considerable herbarium from the Cape de Verd Islands. It is much to be regretted that these plants, collected originally with great care and judgment, were utterly neglected and in part irretrievably spoilt after their arrival in France. Nevertheless this collection still includes a few undescribed species and many new to the Flora. In several instances they are identically the same as those met with by former travellers, but of these species added to our Flora, a much greater number in proportion are either natives of the intertropical regions of Western Africa, or belong to analogous orders and genera, and fewer of them than of those found by the British collectors appertain to the Flora of the Macaronesian region.

The Canaries may be considered as the centres of this kingdom of Flora, which, extending northward as far as the Azores, occupies isolated points from the 15th to the 40th degree of northern latitude, the equability of an oceanic climate compensating for the distance. It is true that a similar vegetation is not found along the whole of this line in similar stations. Thus the Canarian forms which occur in the Cape de Verd Islands, as *Euphorbia Tuckeyana*, Steud., *Campylanthus Benthami*, Webb, *Sonchus Daltoni*, Webb, and others, which replace analogous species of Teneriffe, appear, not on the coast, but on the mountains of the Gorgonean group. A Senegambian vegetation occupies the coast; the same law operating which causes the plants of the coast-line in the arctic regions to reappear on the summit of the Alps, and *Rosa canina*, *Pyrus Aria*, and other European species to occupy a station 9,000 feet above the level of the sea and the Peak of Teneriffe.

Nearly a fifth of the species enumerated in the 'Spicilegia Gorgonea' belonged to the Macaronesian region,—a remarkable fact, since the Cape de Verd Islands are on its extreme southern frontier. This proportion will be now slightly diminished. In the south this Flora is combined with tropical, in the north with Mediterranean and Arabian forms. The central or Canarian group, the richest in indigenous vegetation, as described in the *Phytographia Canariensis*, contains, out of 1,116 species of flowering plants and ferns, 363 (or about a third) peculiar to the region of which it is the nucleus. The Azorian group is not yet thoroughly investigated; but it is probable that, being nearly as far removed from the centre in a northern direction as the Cape de Verds are towards the south, the proportion of their Flora appertaining to that of the central cluster of islands will not be very different from that of the tropical group,—that is to say, less than a fifth.

In conjunction with so great a similarity in this insular vegetation, it is worth while to remark that scarcely a species of the Macaronesian Flora is found on the African continent opposite, or even to the north of, the Cape de Verd Islands, and one species only, the *Laurocerasus Lusitanica*, reaches the European continent in Portugal. The causes of this difference are probably not very remote ;—but this topic would lead us too far away from our present purpose.

ANONACEÆ.

1 *a.* Anona *muricata*, Linn. This American species, of common occurrence in the West Indies, is found naturalized, according to M. Bocandé, in the island of Santiago.

1 *b.* Anona *Cherimolia*, Mill. Likewise an American species, cultivated throughout the tropics, and as far north as Palermo, where it ripens its fruit. It is, as Mr. Bentham observes, perfectly naturalized in the Cape de Verd Islands, and occurs in our present collection.

RESEDACEÆ.

12. Caylusia *canescens*, St. Hil. Although our present collection adds nothing to this Order, yet a few remarks, in addition to what has already been said on *Caylusia canescens*, St. Hil., in regard to the peculiar conformation of its ovarium, will not be out of place here.

This species is supposed to present the structure, very rare in itself, and anomalous in this tribe, of a free central placenta. Such is the conclusion to which a very able and ingenious observer, M. A. de St. Hilaire, has arrived (2ème Mém. sur les Resed. p. 28) ; and his opinion has been reproduced by Dr. Lindley and Endlicher, in their highly valuable works, the 'Vegetable Kingdom' and the 'Genera Plantarum.' I am, therefore, desirous of showing that this anomaly is rather apparent than real, and that the general conformation of the Order provides us with a different solution.

The placenta, evidently parietal in the greater number of species of *Resedaceæ*, is the result of the union, more or less protracted from the base upwards, of the seminiferous margins of two proximate ovarian leaves. The edges of these leaves, in their upper portion, where they are free, are generally folded inwards, and, above their united portion, downwards. Each ovarian leaf is surmounted by two stigmata, being the summits of its two marginal nerves. These two stigmata, belonging to the same phyllidium, are confluent, either in part, as in many *Resedaceæ*, or entirely so, as in *Caylusia*.

The above is the primary and usual conformation of the Order. *Caylusia* presents merely a modification of this structure. The phyllidia in this genus are six in number, and free to very near their base, the six short double placentæ, the result of their union, coalesce, and, masked by the thickened bases of the leaves, seem to form what has been called a central placenta, but which in fact is a mere union of the approximated portions of the twelve margins of the six ovarian leaves. There are necessarily thus six very short parietal placentæ. That this is the case is demonstrable not only from analogy, but from the position of the ovula, which are not scattered over the surface of a truly central placenta, as in *Myrsineaceæ*, but are twelve in number, forming at the base of the apparently central placenta a marginal row, and on closer inspection it is easy to perceive that each of them is placed at the base of the placentiferous margin of an ovarian leaf. They are in fact the lower rank of ovules, such as they present themselves in all *Resedaceæ*, and they are thus reduced in number, owing to the extreme shortness of the united placentæ, whence there is room upon each ovuliferous nerve for only one ovule.

The apparently anomalous structure of the ovarium in *Astrocarpus* may be traced to similar causes.

CAPPARIDEÆ.

13 *a*. Cratæva *Adansonii*, DC. Cratæva *læta* ejusd. This fine species, a native likewise of Senegal, has been added by M. Bocandé to the Flora of the Cape de Verds. It is one of those plants which so commonly occur, both on the western and the eastern sides of the African continent between the 10th and the 20th degrees of northern latitude. It was found by Kotschy in Nubia, and by Dr. Oudney in Bornou, and was the only African species of this splendid genus when Mr. Brown published, in 1826, his remarkable observations on the plants collected by Dr. Oudney and his companions. A second has been since added, the *C. Guineensis*, Schum. Mr. Brown observes that the specimens from Bornou, and one from Senegal, are hermaphrodite, but that in a specimen marked as *C. læta*, from Senegal, the flowers were all male, with an imperfect pistillum. In our specimens, as in that of Kotschy, the flowers form almost a perfect corymb, the

exterior or lower alone are perfectly developed, and, intercepting probably the nourishment, are the cause of the abortion of the ovaries of the upper or interior series: the plant seen by Mr. Brown, in which all the flowers were abortive, grew probably in a meagre soil. The length of the stamens in our plants is variable, some attaining or even surpassing that of the *Gynophore,* and others in the same flower remaining undeveloped, or more than half as short as that organ. A similar abortion (and from a like cause) of the interior flowers is observable in many umbelliferous plants, and is the inverse of that which takes place in several species of the genus *Viburnum,* where the abortion from other causes is inverse.

30. Wissadula *rostrata,* Benth. Fl. Nigr. p. 229. This plant, which is the *Abutilon laxiflorum* of Guillemin and Perrottet, was inserted erroneously in the Spic. Gorg. as *Abutilon periplocæfolium.*

30 *a.* Urena *obtusata,* Guillem. et Per. An addition to the Cape de Verd Flora, which is supposed by Mr. Bentham to be scarcely distinct from the old *Urena lobata* of Linnæus.

SAPINDACEÆ.

43 *a.* Cardiospermum *microcarpum,* H.B.K. This species, confounded in the Spic. Gorg. with its prototype *C. Halicacabum,* L., is found in large quantities in our present collection.

43 *b.* Paullinia *Senegalensis,* Juss. Flowering specimens are sent of this plant.

43 *c.* Sapindus *Senegalensis,* Poir. Apparently this species, though without flower or fruit.

43 *d.* Sapindus *Saponaria,* Linn. This tree, noted already by Brunner as having become wild in the island of Santiago, is sent abundantly.

MELIACEÆ.

43 *e.* Trichilia *Prieuriana,* A. de Juss., Guill. et Perr. Fl. de Seneg. t. 30. Of this species, first discovered in Senegal by M. Leprieur, and which forms a small tree about fifteen or twenty feet high, several specimens occur in our present collection.

VINIFERÆ.

Of this Order, no representatives of which occurred in any former collection from the Cape de Verd Islands, M. Bocandé has sent two species already known as natives of Senegal, and a third which, though likewise found on the African continent, seems to be still undescribed.

43 *f.* Cissus *rufescens*, Guillem. et Perr.

43 *g.* Vitis *pentaphylla* of the same authors, and figured in their Flora of Senegambia, tab. 38.

43 *h.* Vitis *Gorgonobotrys*, Webb. This plant is found in Heudelot's Senegambian collection. It is numbered 906 in the Delesserian herbarium. Heudelot there describes it as having a perennial root and an annual stem. The fruit he did not see. He found this species, though of rare occurrence, on the banks of the Rio Nunez and the Rio Pongo. We give its diagnosis below, from M. Bocandé's somewhat imperfect specimen, in which the flowers are not yet developed.*

RHAMNEÆ.

50 *a.* Zizyphus *orthacantha*, DC. This species, already supposed to be a native of the island of Santiago, is in the collection of M. Bocandé.

TEREBINTHACEÆ.

50 *b.* Sclerocarya *Birrea*, Hochst. Flora (Bot. Zeit.) 1844, vol. i. Besoud. Beil. p. 1. This plant, which seems sufficiently distinct from *Spondias*, is in our collection, though in a very mutilated state.

50 *c.* Spondias *lutea*, Linn. The floral structure of this West Indian species, now become wild in the Cape Verd Islands, is not found in any modern work, and a description of it is therefore added below.†

50 *d.* Anacardium *occidentale*, Linn. Escaped from cultivation, and now wild.

(*To be continued.*)

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* V. caule crasso fistuloso strigose hirto fusco-nigrescente, petiolis tomentosis et pilis strigosis hirtis, foliis cordato-5-lobis, lobis subrotundis apiculatis supra viridibus molliter pubescentibus subtus tomento fulvo velutinis, venis tomentosis fuscis setaceo-marginatis, cirrhis terminalibus, racemis brevibus tomentosis squamæ aphyllæ appositis, floribus parvis confertissimis, calyce cyathiformi subintegerrimo, staminibus 5 ad basin petalorum, receptaculo insertis.

† Arbor, foliis impari-pinnatis, foliolis alternis ovato-lanceolatis acutis nitidis margine undulatis integerrimis. *Corymbi* terminales laxi, ramosissimi, floribundi. *Bracteæ* minimæ. *Pedicelli* filiformes. *Flores* hermaphroditi, vel abortu polygami. *Calyx* brevis, disciformis, 5-dentatus, dentibus minimis acutis. *Corolla* 5-petala,

BOTANICAL INFORMATION.

AMHERSTIA NOBILIS.

If, as we suppose, it must be conceded that the *Victoria Reginæ*[*] is the most splendid flowering herbaceous plant yet known to us, we may with equal justice say that the *Amherstia nobilis* is the most superb flowering arborescent plant. Dr. Falconer writes to us from the Honourable East India Company's Botanic Garden (May 1850)—"Our *Amherstia* has been in great glory this year, and after a sad tendency to decay, I have brought the tree back to the highest promise of vigour by a treatment, I believe, unknown to English gardening. There were, I suppose, upwards of 500 racemes[†] of flowers upon it about six weeks ago, and abundance of young leaves in the green and bronze state, all at the same time. Three pods set upon it, one of which has ripened. The new mode of treatment is to sink vertical pipes of bamboo four and a half feet long, in three rings (or circles) extending nearly as far as the extremities of the roots, and filling them with water at night. The pipes are left open, and the double purpose

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petalis hypogynis æstivatione valvatis oblongo-lanceolatis coriaceis trinerviis concavis, apice acutis glanduligeris, demum reversis. *Stamina* 10, alternis longioribus, ad tori basin externam cum petalis inserta; filamenta tæniæformia; antheræ oblongæ, obtusæ, versatiles, 2-loculares, loculis intus longitrorsum dehiscentibus. *Discus* hypogynus, sessilis, cupulæformis, 5-fidus, laciniis costatis 2-dentatis, ovarii basin cingens. *Ovarium* in floribus hermaphroditis 4–5-costatum, 5-loculare vel sæpius abortu 4-loculare, in floribus masculis effetum. *Ovulum* in quoque loculo unicum, angulo centrali ab apice loculi pendulum. *Styli* 5, vel abortu 4, brevissimi, crassi, apice clavati, obtusi, intus fissi, stigmatibus papillatis per rimam decurrentibus. Fructus . . . .?

[*] The specific name of this plant has been differently written by authors, all of whom have alike intended it to be indicative of the highest mark of rank. It has been called *V. Regina*, *V. regia*, and *V. regalis*. We ourselves, in a late volume of the 'Botanical Magazine,' adopted the name of *regia*, from a belief that the plant was first clearly defined under that name by Dr. Lindley. Mr. J. E. Gray, of the British Museum, has lately shown that we were misled in regard to his and Schomburgk's earlier name of "*Regina*," which was published in the 'Magazine of Zoology and Botany,' of the 1st of November, 1837; whereas the volume of that work incorrectly bears 1838 on its title-page.

We give the preference, in point of date, to the name "*Regina*;" but we venture to place it in the genitive case (*Reginæ*), as was done by the learned Dryander in regard to the "*Strelitzia Reginæ*."

[†] See Dr. Wallich, in 'Plantæ Asiaticæ Rariores,' for a full account of the size of these flowers and the length of their racemes.

is served of giving moisture below among the roots without caking the surface, and aerating the roots and subsoil. The effect has been marvellous upon the *Amherstia*. But just when it was telling most, we were visited with a very severe Cyclone storm, which lasted twenty-four hours, and battered all the young leaves. So ready is this plant to blossom, that this year every *Amherstia* in the Botanic Garden, and even young layers taken last rains, came freely into flower; so much so, that the bunches had to be removed before the buds grew much, to prevent the exhaustion of the young plants."

The *Victoria* will no doubt be a common aquatic in the tanks of India, as the *Nelumbium* is now. "Our new gardener," continues Dr. Falconer, "Mr. Scott, has just come out, and brought some seeds of *Victoria Reginæ* with him. It will look very grand in one of our out-of-door tanks, surrounded by *Nelumbium speciosum*, which we grow almost by the acre, and *Euryale ferox*, and *Nymphæa rubra*, &c. —But we have yet to see whether the seed will germinate."

Notices of several new species of MOSSES *and* HEPATICÆ *from* TIERRA DEL FUEGO; *by* WILLIAM S. SULLIVANT, ESQ.*

The MOSSES and HEPATICÆ here briefly characterized from the vicinity of Orange Harbour, Tierra del Fuego, are a part of the botanical collections made by the "United States Exploring Expedition," under the command of Captain Charles Wilkes.

The purpose of these notices, in advance of more extended descriptions, accompanied by figures, which will appear hereafter, is to secure to the Expedition the priority of its discoveries. This seems the more proper, as not a few species are now, in accordance with approved usage in such cases, credited to other and similar expeditions afloat at the same time, whose collections, made at a later period and in the same locality, were, without delay, placed into the hands of competent persons, and thus made public several years since.

The number of species, now proposed as new, may be considered large; when it is borne in mind that they are not to be found in the extensive collections made in Tierra del Fuego, by (to say nothing of numerous other explorers) the accomplished Naturalist of the British Antarctic Voyage, and may be looked upon as additional evidence of the rare fertility of that country in species belonging to the orders *Musci* and *Hepaticæ.*

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* The talented author of '*Contributions to the Bryology and Hepaticology of North America*,' and of the '*Musci Alleghanienses*,' both of which are noticed in our sixth volume of the 'London Journal of Botany.'

1. Dicranum *involutifolium* (n. sp.); nitidum molle, caule erectiusculo parce ramoso, foliis erecto-patentibus oblongo-lanceolatis e basi ovali concava longe cylindraceo-convolutis, apice obtusissimo subcuculliformi denticulato integerrimove, costa pertenui supra medium desinente, cellulis ultimo apice ovalibus in medio exilissimis flexuoso-linearibus in baseos angulis externis amplissimis quadratis decoloribus . . . .
2. Conostomum *Magellanicum* (n. sp.); monoicum dense cæspitosum, caulibus gracilibus innovando-ramosis inferne tomentoso-irretitis, foliis quinquefariam dispositis oblongo-ovatis obtusis carinato-concavis integerrimis lævibus arctissime (in sicco vel humido) incurvo-appressis costa lata sub apice evanida instructis quadrate laxius areolatis, floribus terminalibus, masculino disciformi antheridiis numerosissimis paraphysibus clavatis, fœmineo capituliformi archegoniis gracilibus paraphysibus filiformibus, perichætialibus longius acuminatis costa excurrente, fructu . . . .
3. Bartramia *pusilla* (n. sp.); dioica, caulibus e basi tomentosa prostrata erectis rigidiusculis dendroideo-ramosis, ramis erecto-patentibus strictiusculis, foliis caulinis ovato-lanceolatis adpresso-erectis rameis anguste lanceolatis patentibus, omnibus costa excurrente cuspidatis margine celluloso-denticulatis reflexiusculis utraque pagina valde papillosis opacis viridi-glaucescentibus minute quadrato-areolatis, flore masculino terminali disciformi, foliis perigonialibus obtusiusculis evanido-costatis, antheridiis numerosissimis elongatis, paraphysibus longioribus clavatis, fl. et fr. desideratis.
4. Peromnion *Magellanicum* (n. sp.); humile hermaphroditum laxe cæspitosum innovando-ramosum, caulibus ramisque apice congesto-foliosis inferne subaphyllis radiculosis, foliis erecto-patentibus laxe reticulatis lanceolatis margine reflexiusculis lenissime submarginatis apice minutissime denticulatis, costa basi valde incrassata longe excurrente aristatis, capsula erecta oblongo-cylindrica longicolla microstoma annulata, peristomio pohlioideo, operculo conico-hemisphærico apiculato.

5. Plagiochila *acanthocaulis* (n. sp.); pusilla, caule ciliis brevibus strictis bi-tri-articulatis densissime vestito repente diviso, divisionibus adscendentibus superne fasciculato-ramosis, ramis gracilibus flexuosis, foliis dissitis erecto-patentibus obovatis margine dorsali ventralique reflexis argute denticulatis apice 3–5-emarginato-spinosis, fructu . . . .

6. Plagiochila *abdita* (n. sp.); caule adscendente rigidiusculo parce ramoso innovationibus singulis binisve sub apice continuato, foliis arcte imbricatis orbiculatis integerrimis leniter concavis subverticalibus amplexicaulibus adscendendo majoribus, amphigastriis parvis lineari-lanceolatis profunde bifidis segmentis integerrimis (involucri lacinulatis), perianthio foliis involucralibus amplis occulto late obconico, ore compresso repando-denticulato.

7. Jungermannia *decurvifolia* (n. sp.); caule subsimplici elongato flexuoso flagella radiculosa squamosa demittente, foliis arcte subimbricatis subsecundis, margine ventrali dorsalique apicem versus valde involutis itaque subfalcato-decurvis, explanatis oblique rotundo-ovatis, breviter bifidis sinu segmentisque rectangularibus, fructu . . . .

8. Chiloscyphus *porrectus* (n. sp.); caule prostrato parce ramoso, ramis brevibus, foliis flaccidis arcte imbricatis adscendentibus ventricoso-concavis late reniformibus valde in caulem antice porrectis, apice posteriore bidentatis dentibus validis acutis subconniventibus sinu obtuso, margine posteriore undulatis reflexiusculisque, amphigastriis amplis ovatis concavis basi gibbosis acute breviterque bifidis, floribus fructuque desideratis.

9. Sendtnera *quadrilaciniata* (n. sp.); caule adscendente gracillimo debili parce ramoso, foliis amphigastriisque conformibus profunde bifidis, segmentis ipsis minus profunde bifidis, laciniis æqualibus sinu obtuso divergentibus longissimis ligulatis acuminatis varie directis quadrate oblongeve reticulatis, cellulis seriatim dispositis, fl. et fr. . . . .

10. Mastigobryum *Fuegianum* (n. sp.); caule adscendente rigidulo subsimplici inferne flagellifero, foliis laxe imbricatis subhorizontali-patentibus, explanatis gibboso-elongato-ovatis, bi-tri-lobatis margine infero basi dentatis, amphigastriis amplis caule triplo latioribus oblongo-ovatis bi- rarius tri-fidis basi utrinque dentatis, fructu . . . .

11. Symphyogyna *crassifrons* (n. sp.); late laxeque cæspitosa, fronde

parvula procumbente oblongo-cuneata in stipitem flexuosum radicantem desinente, biloba lobis brevibus leviter emarginatis, canaliculata marginibus adscendentibus sinuoso-crenulatis, in medio valde incrassata, epidermide densiore, stratis hypodermicis laxioribus, filo centrali compacto albidulo costæformi percursa, e ventre turione repetito-prolifera; dioica, floribus dorsalibus frondi subimmersis, pistillidiis 18–26 in toro squama laciniata convoluta munitis, antheridiis 5–9 congestis squamis eroso-dentatis tectis; fructu . . . .

The GINGKO-TREE *on Boston Common* (*U. S. A.*)

In a small volume lately published in the United States, entitled 'The Boston Book,' "being a specimen of metropolitan literature," and presented to one of the editor's family by Mrs. Greene of Boston (the lady of B. D. Greene, Esq., of that city), are some interesting particulars relating to a beautiful "Gingko-tree" (*Salisburia adiantifolia*, native of China and Japan) now standing on Boston Common, which we consider well worthy of a place in our pages. A MS. note, accompanying the volume, relates of this tree — "The Gingko-tree formerly stood in a garden belonging to Mr. Greene's father, which garden was in the centre of Boston, rising in terraces and commanding a beautiful prospect. After his death (1832) the house and grounds were sold. This tree was removed at the partial cost of the city (each of Mr. Greene's children paying a hundred dollars towards the expense) to the Mall encircling the Common, and planted before the windows of Mrs. Greene's house, in which she has resided since her husband's death. The tree is a native of China, and was of full size when Mr. Greene, sen., purchased the garden in 1798. It is now in fine leaf and beauty. The accompanying lines appeared in the public papers some months after the tree's removal. Dr. Bigelow, your friend, is the author. He alludes in them to a great pecuniary embarrassment which had pervaded the community."

Mr. A. J. Downing, the distinguished American author of works on landscape gardening and rural architecture (possibly following Loudon) gives 1784 as the period at which this curious tree was introduced into North America "by that zealous amateur of horticulture and botany, the late Mr. Hamilton, of Woodlands, near Philadelphia, who brought the plants from England, where they had been received thirty years previous. There are several of these now growing at Woodlands; and the largest measures sixty feet in height, and three feet four inches in circumference. The next largest specimen that we have seen is now standing on the north side of that fine public square, the *Boston Common.* It originally grew in the grounds of Gardiner Greene, Esq., of Boston; but, though of great size, it was, about three years since, carefully removed to its present site, which proves its capability for bearing transplanting. Its measurement is forty feet in elevation and three in circumference."*

If, as above remarked, this tree was "of full size" when Mr. G. Greene purchased the garden in 1798, there can scarcely be a doubt but that it must have been planted there long before 1784. That it had not attained so large a size as those of Philadelphia is to be accounted for by the superiority of the climate in the latter country over that of Boston.

[Dr. Bigelow, the author of the following lines, is the amiable and talented physician and botanist of Boston, author of the 'Florula Bostoniensis,' 'Medical Botany,' &c., &c.]

To the Gingko-tree on Boston Common; by Dr. Jacob Bigelow.

Thou queer, outlandish, fan-leaved tree,
Whose grandfather came o'er the sea,
A pilgrim of the ocean,
Didst thou expect to gather gear
By selling out thy chopsticks here?
What a mistaken notion!

Hard times, methinks, have been thy fate,
Such as have played the deuce of late
With men's estates and purses,
Since on thy native mount secure,
Thou deem'dst thy title safe and sure,
Nor dream'dst of such reverses.

They dealt thee many a sturdy thump,
They digged the earth beneath thy stump,
And left thee high and dry;
The spot which once thy roots did bore
Is now the garret of a store,
And earth is changed to sky.

They dragged thee sweeping through the street,
They set thee up upon thy feet,
And bade thee sink or swim;
For many a month 't was quite a doubt,
If thou could'st possibly hold out,
Thou look'dst so very slim.

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* Downing, 'Treatise on the Theory and Practice of Landscape Gardening,' published in London, Longmans, 1849.

And every morn a motley crew
Of idling loungers came to view
  Thy withered limbs on high;
And many a knowing look was there,
While some that thou would'st live did swear,
  And some that thou would'st die.

Some shook their heads, and hinted fear,
It cost so much to move thee here,
  That taxes would be cruel;
And some exclaimed, what pity 't was,
In these hard times t' incur the loss
  Of half a cord of fuel.

But thou, most grave and sapient tree,
Their idle talk was nought to thee,
  Yet could not be prevented;
So thou didst wave thy breezy head,
And nod assent to all they said,
  And send them home contented.

Meanwhile thou didst resort to toil,
Sent forth small roots in quest of soil,
  And husband well thy gains;
Two years thou mad'st but little show,
But let thy useless trimmings go,
  And liv'dst within thy means.

Dear Gingko, in these days of dread,
Methinks a lesson may be read,
  In thy lorn situation;
Thy story might perhaps impart
To many a vexed and drooping heart
  Some hints of consolation.

Tell them thou too hast been distressed,
And found thyself at times quite pressed
  For want of friendly propping;
When none who witnessed thy mishap,
Would lend thee half a gill of sap
  To save thee e'en from stopping.

Tell them how low thy *credit* sank,
And how they ran upon thy *bank,*
  And cleared thy *vaults* profound;
How thy *supplies* were all cut off,—
And sure thy *stock* was low enough
  When flat upon the ground.

But thou, brave tree, didst not despair,
But heldest up thy head in air,
  And wast not seen to flinch;
Thou lett'st them know, for very *spunk,*
Thou still hadst something in thy *trunk*
  To serve thee at a pinch.

So when thou hadst *set up* again,
Although thy garb was rather plain,
  Thy garments old and dusted,
Yet men who saw thy frugal ways,
Remembering such in earlier days,
  Believed thou might'st be *trusted.*

The birds, thy customers of yore,
To thy new stand came back once more,
  As an established place;
It made thy heavy *heart* feel light,
When they discharged their bills at sight,
  And paid their *notes* with grace.

And so thou hast survived thy fall,
And fairly disappointed all
  Who thought to see thee down;
And better days are stored for thee,—
Long shalt thou live, triumphant tree,
And spread thy foliage broad and free,
  A *credit* to the town.

The Origin of the existing Vegetable Creation. *By* PROFESSOR J. F. SCHOUW. *Transactions of the Meeting of the Scandinavian Naturalists at Copenhagen, in* 1847, Append. K. p. 119. (Translated from the Danish, by N. WALLICH, M.D., F.R.S., V.P.L.S.)

The history of our earth has made gigantic strides forward during the last half-century. Numerous facts, and conclusions derived from them, have taken the place of arbitrary theories. But as the older periods in the world's history are often better known than the more recent, so likewise are we better acquainted with the ancient periods of the history of our earth's structure than with those of a recent date; for while we possess a tolerable acquaintance with the condition of this globe, its plants and animals, during the Coal-formation, our knowledge is singularly deficient in regard to the epoch which formed the transition from the former to the present creation. It is only in the most recent times that geologists and zoologists have directed their attention to this field of research; while the contributions of botanists towards illustrating the period in question, have been very few. Among the most important questions naturally arising in investigations of this sort, is undoubtedly that relating to the origin and spread of the vegetable world, at present occupying the surface of the globe; and here several points offer themselves for being preliminarily solved.

1. It is asked then, in the first place, whether *every species of plant has originally sprung up in one single spot* (so-called centrum), whence it has afterwards spread over greater or smaller, sometimes immense, tracts; or may we assume, that the same species has originally appeared in several, often far distant, places? And with this question another is connected, namely this: Is it necessary to assume, that each species has originated from one single individual (or two, in the case of bisexual plants), or have several individuals been created simultaneously?

If we take the idea of species to be an assemblage of individuals, originally sprung from one single individual, we build our notion upon an hypothesis, we presuppose a state of things as yet to be demonstrated; since no proof has hitherto been offered in confirmation of such a common origin. But if we attend to the facts presented by the existing geographical plant-distribution, such an hypothesis becomes extremely improbable, and in some cases quite untenable. In order to establish the idea of common centres for the creation of species, we must be prepared to prove by what means these have wandered abroad. It will be easily seen that, while in many cases these means appear to have been adequate for the end, there are many others utterly insufficient to account for the existence of the same species in far distant countries. The ordinary means are the following: man, who by his occupations and pursuits, purposely or otherwise, carries plants from one place to another; the tides of the sea, transporting fruits (Cocoa-nuts for instance) from one coast to another; rivers, which convey fruit and seeds of alpine plants into valleys; winds, that waft them, especially such as are endowed with hairy or feathery appendages, or so-called wings, contributing to their easy transport; birds, who occasionally perform their part in this operation. We may, moreover, assume, where geographical obstacles interpose themselves, that tracts, which in former times connected countries, have sunk (the Channel, the Mediterranean, &c.). But it will be easily seen that these means are very inadequate, when we consider that many species are common to the Alps and Pyrenees on the one hand, and the Scandinavian and Scotch mountains on the other, without being found on the intermediate plains and hills; that the flora of Iceland is nearly identical with that of the Scandinavian mountains; that Europe and North America, especially their northern parts, have various plants in common, which have not been communicated by human aids. Still greater and almost insurmountable obstacles to such a mode of explaining things arise, from the fact that there are plants in the Straits of Magellan and on the Falkland Islands, which belong to the flora of the arctic pole,—for instance, *Phleum alpinum* and *Erigeron alpinus*; and that several European plants appear in New Holland, Van Diemen's Land, and New Zealand, which are not found in the intervening tropical countries, nor are likely to have been introduced; which is strikingly instanced in the case of several fresh-water plants, such as our common Reed, *Alisma Plantago*, several species of *Scirpus* and *Lemna*, *Typha*, *Aira flexuosa*. The quotation of these species, common both to the arctic and antarctic flora, is not derived from those periods when species were not so rigorously defined as in our modern times. The most recent researches, especially of Dr. Hooker, in his expedition to the South Pole, have not only confirmed former instances, but added others. The number of such recurring species is much increased, if flowerless and leafless plants (Cryptogams) are taken into account. These exhibit very many instances of species which the remotest parts of the globe have in common, and which fail altogether in the intervening countries. And yet there exists no ground for assuming, that this sort of plants is endowed with greater facilities of migration; although it is intelligible, that the more simple organizations are produced spontaneously with greater ease, than others more compound. Neither do we find, that plants, whose fruits and seeds would render them more capable of migration, are particularly common to distant regions. A strong argument against any great influence of migration is likewise derived from the fact, that the floras of the antediluvian world seem to have corresponded more closely among themselves, than those at present existing do; although there was then less land—and perhaps only islands—rendering migration a process of greater difficulty. Further: the analogy or difference between existing floras, stands in no proportion to the facilities, or otherwise, of migration; although their influence cannot be denied, for instance, in the occasional scantiness of plants in small islands, very distant from continents. Even with respect to those tracts which offer no impediments to the influence of migration,—for instance, between the west coast of France and the Ural,—it is difficult to suppose this vast territory to have continued a desert, until the vegetation common to both those countries accomplished its migration from the one extreme point to the other of this enormous plain, or from the centre to either.

Those who assume that one single parent plant has produced the countless individuals of each species, seem to forget that the idea of species cannot assuredly be extended to the lowest plants and animals, such as *Lichenes*, *Algæ*, and *Zoophytes*; and that even among the higher orders of plants (perhaps, also of animals) the limitation of species depends frequently upon the particular views entertained by naturalists. Among mammalia, it is difficult to conceive that there can have existed originally more than one parent species; rather the reverse seems to have been the case; America, for example, and the continent of Europe have no species in common; no hares, moles, or squirrels occur in Ireland; no moles on the island of Mona;

and, lastly, most of the English reptiles are wanting in Ireland. These considerations seem not to militate against the theory of the same plants having originated in several places simultaneously, since, as we have noticed before, leafless and flowerless plants of the same species are more frequently found in far distant countries, than is the case with the more perfect plants; and on the other hand, we are justified in assuming that the most perfect animals have rarely, if ever, been produced originally in more than one locality.

Some detailed instances may serve to place this matter in a clearer light. Professor Forbes, a celebrated English author, in treating of this subject, and proceeding on the theory of one parent plant, endeavours to explain the manner in which the British Islands have derived their existing flora. The presence of some Spanish plants in the west of Ireland leads him to suppose that there once existed a large continent, which not only occupied the area now covered by the Spanish Sea, but extended to the Azores, and even beyond, into the Atlantic. Those plants that are common to the South of France on the one side, and on the other to the south of Ireland and the south-west of England, have migrated at the time when no channel existed; while the alpine (polar) plants, common to the mountains of Scotland, Westmoreland, and Wales, and to those of Scandinavia, immigrated from the north, at a period when the coast climate equalled in severity that of the tops of mountains. Migration is conjectured to have taken place by means of frozen islands, or else of some great northern continent, subsequently submerged, between Scotland, Scandinavia, and Iceland. Finally, it is supposed that, in more recent times, the bottom of the North Sea has been raised, connecting England with Denmark and Germany, whereby the plants immigrating from the latter country have forced those of Scandinavia into the Scottish Highlands on the right hand, some few having found shelter in Wales, Cumberland, and Westmoreland; expelling on the left side the southern vegetable forms, and thus occupying the greater proportion of the territory.* According to our author, the Polar flora bordered originally on the Mediterranean flora; a theory which is opposed to all analogy derived from the present order of things.

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* This connection once established, would seem to favour equally much the migration of English plants into Germany.

The case stands differently if we take our ground on the supposition that there were originally many primary individuals; the explanation of the geographical botany of the British Islands then becomes extremely intelligible. The west of Ireland and the south-west of England had in that period, as now, an unusually mild climate, especially in winter, considering their position in latitude; in consequence of which, plants were produced there, common to the analogous climate of Spain and the south of France. The Scotch and English mountains, distinguished, in both periods, by a polar climate, produced nearly the same vegetation as the Lapland and Scandinavian mountains. Under this explanation we need have no recourse to any German immigration.

2. Another momentous problem to be solved is the following:—Do new species continue to be created; or has the existing vegetable kingdom been finally completed?

No doubt recent lists of plants growing in any given country or tract of land, or in the vicinity of certain towns, contain species not enumerated in older lists. But this does not prove that such species are of modern creation. It is well known that a much greater amount of characters was required by old botanists to distinguish between species, than now-a-days; and if we examine attentively the species thus added, we shall find that they are of that very form which the old botanists would have included under other species; and they are accordingly often found united in old herbaria or figures of plants. It often happens that plants are actually discovered, which were not formerly known to be the produce of a given spot; but in such cases the question is not the creation of new species, but of new localities of established species. I have on a previous occasion* endeavoured to prove that the plants which the ancient Roman and Greek authors assigned to the shores of the Mediterranean, as prevailing and characteristic there, were the same as those which at present exist. The most rational mode of accounting for new species being possibly created, seems to be by supposing that a change of climate or soil produces a corresponding change in the character of its plants; or that some casual difference in the normal type of any given plant, may have become permanent by its being isolated. It is in this way that constant varieties have arisen, which may sometimes even have become real species; but on all these occasions it is culture that has been the cause: as far as I know, we possess no facts to prove that natural causes have produced this effect. Indeed, it is much more likely that a species should altogether disappear under a change in external circumstances, than that it should become specifically altered; unless it happens to be of that sort which assumes different habits under different circumstances, as is the case with amphibious plants, and such as take different forms in shade and light. Peat lands, on drying up, produce no longer *Primula farinosa*, species of *Drosera*, *Andromeda polifolia*, *Scheuchzeria*, &c.; but it is not that these plants are transformed into new species. *Anemone nemorosa*, *Hepatica triloba*, *Oxalis Acetosella*, &c., disappear from lands from which forests have been removed; but they are not commuted into new species. The same takes place with *Nymphæa*, *Sagittaria*, and *Stratiotes*, on the desiccation of standing waters: they are not changed. An argument against the creation of new species may also be derived from what occurs when a tract hitherto naked becomes overgrown. Thus, when accessions are made from the sea, it is not new species, but those from the nearest coast, that constitute the vegetation of such new land. Naked lava formations become gradually covered with vegetation, and coral islands, rising above the surface of the ocean, become overgrown. In this last case it seems that only those plants are at first produced, which can be brought as seeds or fruits by currents and waves; for instance, the Cocoa-nut, which is peculiarly fitted for that kind of migration. Hence it is that islands of this nature, if far away from land, are peculiarly poor in vegetation; such as Keeling's Island, south-west of Java, according to Darwin; and various islands of this class in the South Sea, according to Chamisso. To the same cause must be ascribed, probably, the phenomenon that alluvial formations of great extent, and still in progress, possess, if not a poor vegetation, at least one of a very ordinary description, and not marked by any striking peculiarity. Examples of this are the valley of the Nile, Lombardy, and perhaps New Holland.

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* Brewster's 'Edinburgh Journal of Science.'

It is upon those grounds that I look upon it as highly probable, if not absolutely demonstrated, that no species are any longer created.

(*To be continued.*)

Notes and Observations on the Botany, Weather, &c., of the United States, made during a tour in that country in 1846 *and* 1847. *By* WM. ARNOLD BROMFIELD, M.D., F.L.S., &c.

(*Continued from p.* 298.)

In strolling over the town with a friend, I remarked the great difference the climate here produces on cultivated plants and trees, as compared with Montreal. I found little else besides the commonest and hardiest trees and shrubs, in the generally ill-kept and neglected gardens. The Locust (*Robinia Pseudacacia*) has here dwindled to a shrub, at least I saw none deserving the name of trees; but the Lombardy Poplar (*Populus dilatata*) attains a respectable magnitude, and is the tree most planted in public walks. The Lilac (*Syringa vulgaris*) resists the winter's cold perfectly, and thrives here as well as in any part of the States. I saw some very large specimens on the loftiest platform of the citadel, where they must have been greatly exposed, and a very tall bush in the bishop's garden at the entrance gate. The mean winter temperature of Quebec is below that of the same season at St. Petersburg, though 13¼ degrees farther to the southward than the latter city. The tolerance of so severe a climate in a shrub belonging to a southern and somewhat tender natural order (*Oleaceæ*), is very remarkable, and leads me to suppose that the true region of the common Lilac must be on very elevated table-land or mountain ranges in the north of Persia, which country is always assigned to it as its native home. Its inability to bear a continued high temperature favours this belief: it is rarely seen in the gardens of the southern United States, where, as I have remarked at Charleston, it languishes visibly, and can with difficulty be brought to flower. The gardens about Quebec are sadly neglected, and overrun with weeds; the few fruit- (chiefly apple-) trees I saw were mostly small, much moss-grown, and apparently not abundant bearers, even in the propitious years. In fact, neither apples nor pears come to great perfection at Quebec, which is chiefly supplied with these and other finer fruits from Montreal. Peaches and melons are out of the question here in the open grounds, and plums, of which there are but few kinds, succeed but indifferently. In the shops, and at private tables, I saw grapes both white and red, the produce of the gardens here, very small and sour, scarcely eatable.

Strawberries, currants, gooseberries, raspberries, and other small fruits, are the proper production of this part of Lower Canada, as in the north of Europe. In the markets of Quebec and Montreal various wild berries are exposed for sale, as Cranberries (*Vaccinium macrocarpum*), and the fruits or haws of the different species of *Cratægus*, which abound here, also the mealy berries of *Viburnum prunifolium*, that are not unpalatable, and taste exactly like those of our own Wayfaring-tree, *V. Lantana*.

Quebec, September 28th.—Set off in the forenoon with a friend who accompanied me hither from Hamilton, for the falls of Montmorency, about nine miles below the city, passing through Beaufort. The weather fine, yet for awhile rather dubious; but before midday it became bright and clear, with a warm sun, a luxury I did not once enjoy in the town during my stay at Quebec. The country from thence to the falls is pretty, but vegetation has a pinched and stunted aspect, which may be as much owing to the natural sterility of the rocky soil below Quebec, as to the unfavourableness of the climate. Whichever be most to blame, the diminished stature of the ligneous vegetation, as compared with that around the sister city of Montreal, stands in prominent and unpleasing contrast. The cottages of the Canadian villagers are white-washed, and have an air of considerable neatness and comfort, but horticulture is sadly neglected by them, and in the few apple-orchards we passed, the produce was exceedingly small. I think I remarked patches of Indian corn in a few places, but the climate must be against the successful cultivation of that grain, at least to any extent, and I remarked little or no evidences of good farming, the inhabitants hereabouts being mostly small tenants on the *seigneuries* of the French proprietors. The trees and shrubs observed on the road were *Ulmus Americana*, a species of Ash, and two or three kinds of *Cratægus*, with red berries: the species of this genus, which are of difficult determination from description alone, and whose characters and synonyms appear greatly confused, are amongst the most frequent of shrubs in Lower Canada, often forming entire thickets. *Cichorium Intybus* grew plentifully, and in flower, by the roadside; whilst *Euphorbia helioscopia* and a tall green-flowered *Amaranthus* were observed abundantly in waste grounds in several places. On a fence I gathered a *Vitis*, which agreed with *V. riparia* in having the leaves subtrilobate, ciliate on the margin, and pubescent underneath on the nerves and petioles. From the high banks of the St. Lawrence above the falls we enjoyed a fine view of the Isle of Orleans, said to be the garden of Quebec, which its rich and well-cultivated aspect appeared to confirm. The falls themselves, picturesque as they undoubtedly are, and worthy of a visit, should be seen before, and not after, Niagara, or at least not till the impression produced by the latter has lost somewhat of its vividness by time.

The trees and shrubs remarked at the falls are, from the rocky nature of the soil, of small size. They consist of two or three species of *Cratægus; Corylus Americana*, plentiful; a species of *Amelanchier*, not determinable, through want of fruit and flowers; *Acer Pennsylvanicum*, here quite a shrub; *Acer rubrum* and *A. saccharinum*, both very diminutive; *Fagus ferruginea; Populus balsamifera*, as a shrub; *Betula populifolia*, or perhaps *B. papyracea*, abundant, and the largest tree here; *Pinus balsamea* (Balm of Gilead Fir), plentiful here and about Quebec generally; *Shepherdia Canadensis*, as a very low bush on the rocks, which at Niagara grows six or seven feet high; *Cornus stolonifera* and *Pyrus Americana* (*P. Aucupariæ* var.?), both common around Quebec. The berries of the latter, both wild and in the gardens, were bright red, as in the European Mountain-Ash, not fulvous or purple, as described by Pursh and others.

September 30*th.*—Yesterday and to-day were pretty much alike in general character, beginning with cold rain, and ending with the same dull, damp, and foggy atmosphere, uncheered by even a transient gleam of sunshine. There was this difference, however, between them, that whereas yesterday was perfectly calm and not very cold, it reminded one exactly of dull November weather in England, whilst to-day we seemed to have made a leap into downright December; indeed, it would be a libel on that month, as it usually comports itself at home, to ascribe to it, as an ordinary attribute, such ultra-winterly weather as we experienced on this the closing day of September. A piercing, and at the same time damp, north-east wind blew a heavy gale all the forenoon, when the garrison in the citadel might be seen relieving guard in closely buttoned-up greatcoats of thick grey cloth, or hurrying across the parade-ground with their hands withdrawn into their cuffs for protection against the nipping blast, which a kind friend, who had brought me up to view the fortifications and the noble prospect from Point Diamond, had with myself some difficulty in breasting, such were its force and keenness. In the afternoon the gale moderated, but the sky continued all day thickly overcast, with much wind again at night.

Walked out to the Coves, a long straggling village under the high banks of the river, a mile or two above Quebec, where the lumber trade of the city is carried on. A great part of the population seemed to be Irish; and, the situation of the place being well sheltered, the vegetation was luxuriant, and the foliage of the trees less changed to its autumnal hues than on the higher more exposed grounds. The excellent and laborious Bishop of Montreal, Dr. Mountain, to whom I had an introduction from a mutual friend in England, assured me that the trees were unusually green for the season, in ordinary years the leaves changing to their autumnal covering by the middle or end of September. On crossing the plains of Abraham, I stopped for a moment at the spot where General Wolfe fell, marked by an insignificant column, now much dilapidated, with the simple inscription, "Here Wolfe died victorious." On these plains I picked a small specimen, in flower, of *Euphrasia officinalis*, a plant scarcely found, I believe, in the United States, unless on the highest mountains in New England, although abundant even at the sea-level over a great part of Europe. The steep banks of the St. Lawrence, which consist of a sterile slaty rock, are here covered with *Rhus Taxicodendron*, called by the French Canadians *Herbe aux Puces*, for what reason I know not. The plant shows no disposition to climb, or any tendency to attach itself here, as elsewhere, in the manner of ivy to the trees and shrubs in the thickets that clothe the summits of these rocky slopes, and indeed principally confines itself to their denuded and precipitous bases, which it covers with its short decumbent or ascending stems, a foot or two in length, that again take root here and there, but can scarcely be called trailing. The fruit, which was fully ripe, is small, dry, furrowed, and of a brownish-white colour, looking much like blighted white currants. The poisonous property of the plant by contact is known and dreaded here, but I found it as usual inert on my own person. *Silene inflata* is common along the river, the leaves fleshy, and the panicle fewer-flowered and more spreading than with us, the whole plant approaching somewhat *S. maritima* in habit. The rocky thickets above the St. Lawrence are mainly composed of different species of *Cratægus*, which abound more about Quebec than I observed them to do elsewhere in Canada, and overspread whole acres, presenting very puzzling variations. The trees that crown these heights are all, excepting the Pines, of small dimensions, and consist of the following species:—*Acer saccharinum* and *A. rubrum; Quercus coccinea*, the only kind of oak seen in this neighbourhood, and very small; *Populus trepida* (*tremuloides*) and *P. grandidentata; Ostrya Virginica; Amelanchier — ? Betula papyracea? Fagus ferruginea* here and there, but very stunted; *Tilia glabra*, abundant; *Viburnum Opulus*, var.? *Oxycoccos*, which I am unable to distinguish from the type; *Cornus stolonifera*—of this I found an individual with the stem quite prostrate. The American *Arbor Vitæ* (*Thuja occidentalis*) is extremely plentiful on these rocky slopes, to the beauty of which it much contributes, from the picturesque form of its growth. The Pines, which here form groves, are *P. Strobus*, of which I remarked many fine specimens, *P. balsamea*, and a *Larix*, probably *L. pendula*. In open places, under trees, grew *Cornus Canadensis* abundantly, and in close thickets the Blood-root, or Puccoon (*Sanguinaria Canadensis*). When cut or broken across, a red juice exudes from the vessels of the root, as from the orifices of divided veins and arteries.

October 1*st*.—Another miserable morning, excessively cold and wet: the rain, at eight A. M., mingled with large flakes of snow, which continued for some time, but melted as they fell. The weather held up towards noon, but continued cold and cloudy, with a strong wind from N. E. the whole day. About sunset a partial gleam for a short time, night cold and cloudy, with but little wind. On this and on the 3rd (for it rained the whole of the 2nd without ceasing), which was more propitious for sylvan rambles, I explored the beautiful woods along the road to Cape Rouge (pronounced Carrouge), some miles above the city. The trees here were now in the full flush of their autumnal colouring, much more so than under the sheltered banks of the St. Lawrence. The very undergrowth was fading fast; and as few of the leaves had yet fallen, and many were still fresh and verdant, the depth, variety, and richness of the tints could hardly be conceived. I believe it is in the more northern parts of the United States, and in Canada, that we must look principally for the full display of those gorgeous hues which, as it were, illuminate the woodland scenery of America in autumn with colours so bright, that an artist might well be afraid to paint them in their full intensity, lest he should be suspected of exaggeration, or accused of destroying the harmony of the picture by such sudden and violent contrasts as even Nature herself, the source of all that is truly chaste and harmonious, here indulges in. It would seem requisite for the production of the autumnal colouring in all its brilliancy that it should be the sudden result of severe frost upon the leaves, not of their gradual prolonged decay; and I particularly remember that on my return southwards into the middle section of the United States, I saw nothing in the fading foliage around Philadelphia at all comparable to the splendour of its colouring farther north in Canada and New England. The weather throughout November, in Pennsylvania, was remarkably wet and mild, with little or no frost at night, and the leaves were in consequence late in falling, and very slow in fading away into their respective autumnal tints. We see precisely the same thing take place in England, where the beauty of the autumn landscape is heightened or diminished as the season is dry and frosty, or wet and warm. The splendid colouring of the Canadian woods was mainly derived from the Sugar and Red Maple (*Acer saccharinum* and *A. rubrum*), and from the Red Oaks (*Quercus coccinea*), the crimson and scarlet of whose dying leaves it was almost painful to the eye to look upon close at hand.

The ligneous vegetation here was composed of the following species:—Red and Sugar Maple; Moose-wood (*Acer Pennsylvanicum*),—the two former most abundant, the last frequent as a shrub, its huge leaves now of a fine pale yellow; Beech (*Fagus ferruginea*), plentiful, but not of any great size, still preserving in this northern climate the chestnut-like character of leaf so distinctive of the American from the European species; American Mountain-Ash (*Pyrus Americana*), a mere variety, as it seems to me, of *P. Aucuparia*, and the Pines before mentioned, make up the bulk of these woods. As under-growth I remarked the Hasel (*Corylus Americana*), Hobble-bush (*Viburnum Lantanoides*), common, and perfectly distinct from our *V. Lantana*, of which Loudon (Arbor. Brit.) strangely thought it a variety. The English name is said to have been given it, from the tough procumbent branches, that, lying in one's path, might cause one to stumble, or hobble. *Viburnum nudum* was a frequent and neat under-shrub: its shining green leaves, looking almost as if persistent, emit, like the *Laurustinus*, an offensive odour in fading: it grows both in dry ground and in sphagnous bog. In the swampy parts I found abundance of *Kalmia angustifolia*, but failed in finding *K. glauca*; *Andromeda polifolia*? and another, like a broad-leaved variety of the same species; *Ledum latifolium*? a small shrub with oblong rugose leaves, their margins strongly revolute, woolly underneath, with rusty tomentum. *Nemopanthes Canadensis* formed little thickets two to four feet high, and was now loaded with its dull crimson berries, the size of peas, on long, slender, drooping peduncles; *Epigæa repens*, *Gaultheria procumbens*, and *Vaccinium macrocarpum*, with one or two shrubs I was unable to determine, from want of flowers or fruits. The season was too far advanced for most of the herbaceous plants, of which very few remained in a condition to be recognized with certainty. *Cornus Canadensis* and *Pedicularis Canadensis* were common under the trees, and a species of *Trillium* was gathered, out of flower and fruit. *Sarracenia purpurea* occurred here and there in boggy spots, and in moist places *Lycopodium dendroides*, even now bearing spikes, which probably survive the winter and fructify the following year. The constantly cold and broken weather giving warning of the near approach of winter, made a retreat from the inhospitable climate of Lower Canada both expedient and agreeable; so, stepping on board the steamer Lord Sydenham, on the night of the 3rd, I arrived early the next morning once more at Montreal.

(*To be continued.*)

Note, by DR. JAMES RICHARDSON, *on the* DATES OF FEZZAN: *in a letter from Mourzuk, addressed to, and communicated to the Editor by* LORD VISCOUNT PALMERSTON, *Secretary for Foreign Affairs.*

Mourzuk, 14th May, 1850.

MY LORD,—The great resource of the inhabitants of the Oases of the Sahara is the Date-Palm. When every other species of food fails, the Date-Palm yields, with the returning year, its nourishing and powerful fruit, and saves the population of the Desert from perishing of hunger.

Nineteen-twentieths of the population of Fezzan live on dates during nine months of the year. Many of the animals, likewise, feed on dates the greater part of the year, the Oases being bare of herbage.

It is, therefore, My Lord, very useful, as well as interesting, to write some account of the various species of this fruit. I have collected from the mouth of the natives of Fezzan, the Arabic names of nearly fifty different species of this precious fruit, cultivated in those Oases, with a brief description of the qualities of each of them.

I am, &c. &c.,
(signed) James Richardson.

Various species of the Date-fruit cultivated in the Oases of Fezzan.

1. *Tasfer't.* Long-shaped and longish, red, and of a good quality; ripens late.
2. *Amo'uwee.* Large and round, red, sweet and good; ripens late.
3. *Am'reer.* Small and round, black, "*reteb*"* (literally *soft*), or does not become dry so as to be preserved as an article of food; ripens soon.
4. *Talees.* Very long-shaped, red, very sweet; ripens late.
5. *El Kaub.*† Small and round, sweet, and *reteb*; ripens soon.
6. *El Koka'ee.* Small and round, sweet; ripens late.
7. *Sâbie'r.* Largish and round, sweet; ripens late.
8. *Saloúloú.* Large and round, and deliciously sweet; esteemed as the finest quality of all Fezzan dates; ripens late.
9. *Taghaíat.* Long and largish, red, and very sweet; ripens late.
10. *Fer'takoú.* Large-shaped and good-sized, red, very sweet; ripens late.
11. *Sâloum'.* Long and largish, red, sweet; ripens soon; partly *reteb.*
12. *Tai'b Bela'h* (*i. e.*, good dates). Small and round, yellow, and very sweet.
13. *El Kouwee'yaf.* Long and smallish, red, *reteb*, and good; soon ripens.
14. *Nafous'h.* Round and large, red, good quality, and of the species which ripens latish, if not the latest.
15. *Jinfak'h.* Large and round, red, good; ripens late.
16. *Loo'ree'k.* Small, thin, and filberd-shaped, yellow, exceedingly sweet; ripens soon.

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* A great quantity of dates are *reteb.* Both in the suburbs of Tripoli, and in the Isle of Jubat, nearly all the dates are eaten as soon as gathered, not drying, so as to serve for wholesome food, being "*reteb.*"

† There is a certain arbitrary use of the Arabic article prevalent in all these countries, as before the names of towns and wells:—the article is sometimes used before the name of a species of date-fruit.

17. *Haja'b.* Large, round, red, good; ripens late.

18. *El Khathar.* Long, black, good quality, *reteb,* but hardens a little, sweet; ripens late.

19. *El Amzough.* Large and oval, black, and sweet, *reteb,* but dries a little; ripens late.

20. *El Kama'r.* Largish and round, black, good, *reteb*; ripens soon.

21. *Aghleen'.* Small and round, red, sweet, *tamer and bihah,* or having ripe and unripe dates; *i. e.,* some of the dates never reach maturity. All animals eat of this kind of dates, and are very fond of them.

22. *Ta'kadaf.* Large and oval, black; ripens very early, or soonest of all.

23. *Nă'fza'wee.* Long and large, red, good quality; ripens late.

24, *Maka'resh.* Large and round, red, very sweet; ripening late.

25. *El Fă.* Large and round, red, good quality; ripens late.

26. *El. Bee'youth.* Small and thin, of a good quality, but having very large date-stones; ripens with the earliest.

27. *El Kadee'r.* Small and round, black, *reteb,* good; soon mature.

28. *El Hama'j.* Round and large, red, *reteb,* good; soon mature.

29. *Asbă'-Arous* (*i. e.,* "Fingers of the Bridegroom"). Long and large, red, moderately good; mature late.

30. *Lou'ka'lee.* Large and round, red, good quality; mature late.

31. *Toua'tee* (probably from Touat). Largish and round, good, red; mature late.

32. *Shă'ran.* Largish and round, red, very sweet; ripens late.

33. *Omm'-ells-Thiha'b* (*i. e.,* "Mother of Gold"). Oval, largish, yellow, *reteb,* and sweeter than any kind of dates; mature soon.

34. *Taghedshah.* Round and very large, very sweet, yellow; mature late.

35. *El Ha'falee.* Large and oval-shaped, sweet and good, lasts long, eaten by the sick; mature soon, of a red colour.

36. *Ta'ïb.* Large size and round, sweet; mature soon, of a red colour.

37. *El Sunbi'lbi'l.* Largish and round, good for food; ripening at the average time, and hollow.

38. *El Ta'mes'kal.* Large and round, good in every quality; mature soon, yellow in colour.

39. *El Kerba'ou'wee.* Small, round, black; mature soon.

40. *Mak-mak.* Small and round, yellow, very ordinary sort; mature late.
41. *Sunā'l.* Large and round, red, good quality; mature late.
42. *El Kara'fes.* Small and round, red, ordinary quality, like Mak-mak; mature with the greater part.
43. *El Karata'wee.* Small and round, yellow, sweet and good; mature with the greater part.
44. *Bor'nee.* Large and very long, yellow, good quality; ripens in the usual date-time.
45. *Thahabee.* Large and long, yellow, has small date-stones; ripens early.
46. *La'ghou'l.* Small and filberd-shaped, red, *reteb,* sweet; soon ripe.

OBS. In Soudan the Date-Palms bear flowers, ripe and unripe dates, "*reteb,*" and "*belah,*" all at the same time,—apparently a vitiated state of growth. Many of the fruit-trees of northern Africa, as oranges, have also a diseased growth in Soudan, and bear no fruit.

Contributions to the Botany of WESTERN INDIA;

by N. A. DALZELL, Esq., M.A.

(*Continued from p.* 265.)

Nat. Ord. LABIATÆ.

POGOSTEMON.

1. P. *purpuricaulis*; caule erecto suffruticoso purpureo nitido tenuissime pubescente, foliis late ovatis acuminatis grosse duplicato-dentatis in petiolum cuneatim attenuatis utrinque tenuiter pubescentibus vel glabriusculis, verticillastris dimidiatis approximatis, paniculis axillaribus terminalique pyramidatis laxis, paniculæ ramis oppositis decussatis trifidis, bracteis exterioribus ovatis interioribus lanceolatis basim versus attenuatis calycem æquantibus.

Calycis pentagoni glanduloso-pubescentis dentes anguste triangulares, acuti, ciliati. *Corollæ* labii superioris lobi maculis geminis purpureis notati. *Folia* majora cum petiolo bipollicari 7 poll. longa, $3\frac{1}{2}$ lata,

superiora paulo minora. *Caules* 5–6-pedales, rami obtuse tetragoni. *Nuculæ* sublenticulares.—*P. plectranthoidi* affinis.—Crescit fere ubique. Tota ribes nigras redolet. Fl. temp. frigido.

2. P. *purpurascens*; caule herbaceo tetragono 4-sulcato pilis patulis molliter tomentoso, foliis petiolatis late ovatis acutis basi cuneatis duplicato-serratis rugosis utrinque molliter villosis, verticillastris inferioribus in foliorum superiorum axillis sessilibus multifloris distantibus superioribus terminalibus simpliciter spicatis approximatis, bracteis sub calyce ovatis acutis foliosis reticulato-venosis subtus villosis calycem æquantibus, calycis pentagoni herbacei villosi segmentis triangulari-subulatis 3-nerviis, filamentis styloque longe exsertis.

Folia purpurascentia, 4–5 poll. longa, 2–2½ lata. *Corollæ* tubus albus; labium superius purpureum, marginibus albis, inferius album, acutum. —Crescit in sylvis umbrosis Concani; fl. Oct. et Nov.—Each branch in this plant is terminated by a simple dense subsecund spike, 2–3 inches long.

DYSOPHYLLA.

1. D. *erecta*; caule erecto ramoso patenti-hispidulo, foliis 9–12-verticillatis anguste linearibus apice obtusis basi parum angustatis utrinque papilloso-scabridis subtus glanduloso-punctatis internodia æquantibus, *floralibus filiformibus grosse et oblique capitatis* calycis longitudine, corollæ lobis omnibus integris, calycis villosi dentibus erectis obtusis.

Herba erecta, 7–8-pollicaris: folia 6–7 lin. longa; spica densissima, 1½–2 poll. longa.—Crescit in stagnorum marginibus provinciæ Malwan; fl. Sept.

2. D. *gracilis*; caule erecto stricto 9-pollicari superne parce ramoso pilis patulis mollibus hirto, foliis verticillatis septenis anguste linearibus acutis margine revolutis internodio longioribus 4 lineas longis ⅓ lin. latis apicem versus distanter et minute dentatis, *floralibus linearibus acutis* dense ciliatis *calyce duplo longioribus* corollamque superantibus, calycis villosi dentibus acutis, corollæ dente supremo minore integerrimo.

Spica densa, pollicaris.—Crescit in montibus Syhadree, prope Phonda Ghaut; quoad habitum præcedenti simillima; fl. Oct.

3. D. *tomentosa*; tota pilis longis patulis molliter tomentosa, *caule repente*, ramis pluribus simplicibus erectis, foliis 6–9-verticillatis linearibus acutis internodiis multo longioribus integerrimis subtus

glandulis conspersis marginibus revolutis, floralibus conformibus, calycis tuberculato-glandulosi densissime tomentosi dentibus triangulari-ovatis obtusis pilis multo brevioribus.

Caules 10–12 poll. longi. *Folia* crebra, 4–4½ lin. longa, ½ lin. lata, basi non dilatata, floralia 2 lin. longa, apice 1–2 setulis diaphanis longis terminata.—Crescit in oryzetis prov. Malwan, inter Deoghur et Viziadroog; fl. Dec.

LEUCAS (§ *Ortholeucas*).

L. *collina*; suffruticosa, erecta, ramis tetragonis adpresse tomentoso-villosis, foliis petiolatis ovato-lanceolatis acutis basi cuneatis grosse crenato-serratis supra molliter pubescentibus viridibus subtus adpresse tomentosis canescentibus, verticillastris 10-floris, bracteis ciliato-hirsutis linearibus vel anguste spathulatis calyce dimidio brevioribus, calyce tomentoso turbinato-tubuloso, ore æquali, dentibus erectis subulatis, alternis brevioribus.

Rami e radice perenni stricti, 3–4-pedales, pilis reflexis arcte adpressis vestiti. *Folia* inferiora cum petiolo semipollicari 3–4 poll. longa, 1–1½ poll. lata. *Calyces* fructiferi 4 lin. longi, intus glabri, divaricati, patentes. *Corolla* alba, tubus intus medio transversim annulatus; corollæ labii inferioris lacinia intermedia emarginata.—Crescit in collibus parum elevatis Concani utriusque; fl. in temp. pluviali.

Nat. Ord. ACANTHACEÆ.

CRYPTOPHRAGMIUM.

C. *glabrum*; spica terminali composita brachiata subpedali, foliis ellipticis acuminatis in petiolum alate decurrentibus denticulatis *glabris*, corolla calyce plus duplo longiore.

Caulis glaber, obtuse tetragonus, 2 lateribus oppositis minute verruculosis. *Folia* cum *petiolo bipollicari* semitereti glabro 10–11 poll. longa, 2½ poll. lata, venis arcuatis alternis, *costa non sulcata*. *Bracteæ* sub ortu ramorum floralium *ovatæ* v. *lanceolatæ, acuminatæ*. *Calyx* 3 lin. longus, ad basim 5-partitus, laciniis subulatis cum rachi bracteolisque dense glanduloso-pubescentibus. *Bracteolæ* ad basim calycis lateralis 3, subulatæ, in duarum superiorum axillis, alabastri abortivi. *Corolla* 8 lin. longa, alba, extus glanduloso-pubescens, intus punctis purpureis crebris maculata: tubus infractus, sursum parum dilatatus; labium superius adscendens, inferius porrectum, laciniis omnibus lineari-oblongis obtusis. *Stylus* hispidulus, apice glaber; ovarium apice densissime glanduloso-pubescens; ovula in quoque loculo 10, biseriata.—*C. venusto* affine, sed differt foliis glabris, bracteis corollaque minore difformibus.—Crescit in umbrosis Concani australioris; fl. temp. frigido (Dec. Jan.).

BARLERIA.

1. B. *Gibsoni*; suffruticosa, diandra, tota glaberrima, staminibus effœtis 3 anantheris squamiformibus, foliis ellipticis utrinque acutis subtus glaucis margine setulis minutis ciliolatis, floribus spicatis, spicis terminalibus brevibus solitariis, bracteis parvis foliaceis anguste ovatis obtuse acuminatis, bracteolis linearibus acutis, calycis laciniis majoribus ovalibus subæqualibus integerrimis.

Spica 1–2 poll. longa, pallida: flores quadrifariam imbricati, pauci. *Folia* breve petiolata, 4–7 poll. longa, 1½–3 poll. lata, reflexa, arcuata, subcomplicata, supra lineolata. *Bracteæ* 4–5 lin. longæ, penninerves, calycis laciniis majoribus dimidio breviores. *Bracteolæ* 3 lin. longæ, bracteis paulo breviores, lineares, acutæ, complicatæ, margine ciliolatæ. *Calycis* laciniæ majores 9 lin. longæ, 5 lin. latæ, palmatim 9–10-nerves, herbaceæ, flavo-virentes. *Corolla* bipollicaris, pallide rosea: tubus parte inferiore purpureus, limbi laciniæ cuneatæ, obovatæ, duo superiores basi purpureo-maculatæ, inferior paulo brevior. *Staminum* sterilium rudimenta squamæformia, longe setaceo-acuminata, glandulosa. *Stigma* truncatum, purpureum. *Capsula* calyce paulo brevior, glaberrima, cuspidata, basi vix attenuata, tetrasperma. *Semina* fusca, glabra, vix compressa. Fl. temp. frigido.—This species was grown from seeds sent by Dr. Gibson, the superintendent of the Honourable Company's Botanical Garden; but of the original locality I am ignorant. It is one of the prettiest species I have seen.

2. B. *grandiflora*; caule fruticoso, foliis ellipticis acuminatis basi in petiolum semipollicarem attenuatis (superioribus subsessilibus) utrinque glabris margine ciliolatis, floribus in axillis oppositis solitariis breve pedicellatis, bracteis in pedicelli medio insertis brevibus subulatis, calycis laciniis majoribus æqualibus ovatis acutis herbaceis glabris palmatim 10–12-nervibus, inferiore apice interdum bidenticulato, laciniis minoribus angustis subulatis duplo brevioribus, staminum breviorum filamentis anantheris rudimento quinti.

Rami glabri, ad nodos tantum tomentosi. *Folia* 5–6 poll. longa, 1½–

2 lata; bracteæ 4 lin. longæ. *Calycis* laciniæ majores 2–2½ poll. longæ, fere 1½ poll. latæ. *Corolla* alba, 4–4½ *poll. longa*, limbi laciniis (16 lin.) obovatis acutiusculis. *Capsula* calyce brevior, fere bipollicaris, apice acuminata, glanduloso-pubescens, tetrasperma: semina (immatura) valde compressa, orbicularia, intense viridia, glabra.—Crescit in montibus Syhadree ad Tulkut Ghaut; fl. temp. frigido (Dec.).

LEPIDAGATHIS.

1. L. *clavata* (spicæ terminales); caulibus e radice lignosa pluribus adscendentibus simplicibus obtuse tetragonis glabris basi nudis, spicis terminalibus solitariis simplicibus oblongis tetragonis, foliis parvis sessilibus ovato-acuminatis spinoso-mucronatis glabris integris coriaceis rigidis, bracteis 5-nervibus dense quadrifariam imbricatis, foliis conformibus utrinque cum bracteolis calyceque sericeo-tomentosis.

Caules 5–7 poll. alti. *Spica* bipollicaris, purpurascens, terminalis, spinosa. *Folia* subcomplicata, decussata, 8–9 lin. longa, 4 lin. lata, semiamplexicaulia. *Bracteolæ* 4½ lin. longæ, calyce breviores. *Calyx* 5–6 lin. longus: lacinia anterior bipartita, segmentis lineari-lanceolatis, laciniæ laterales subulatæ, posterior cæteris latior, omnes pilis sericeis patulis vestitæ. *Corolla* rosea, 8 lin. longa: labium superius latum, rotundatum, bidentatum, labii inferioris lobi oblongi, obtusi, subæquales, extus pubescentes, faux palatumque flavo-maculata, glabra. Interdum spicæ radicales vel axillares adsunt, sed semper depauperatæ et imperfectæ, nec florigeræ.—Crescit in montibus Syhadree, prope Chorla Ghaut; fl. Jan.—This is a singular species, and not likely to be confounded with any other.

2. L. *Goensis* (Sect. alienæ); caule herbaceo geniculato dichotomo diffuso, foliis late ovatis acutis repando-dentatis molliter pubescentibus, spicis terminalibus in pedunculis bi-trifidis congestis laxis paucifloris, bracteis communibus late ovatis obtusiusculis, bracteolisque linearibus calycisque laciniis dense glanduloso-pubescentibus.

Folia inæqualia, cum petiolo 4-lineari 1½–2 poll. longa, 10–12 lin. lata, in petiolum subito decurrentia, *utrinque hirsuta*. *Bracteæ* communes 4 lin. longæ, 2 lin. latæ; bracteolæ ad basim floris singuli duo, lineares, calycis lacinias laterales æquantes. *Calyx* 5-partitus: laciniæ anteriores lineares, acutæ, dorsalis cæteris longior, lanceolata, 3-nervis, laterales subulatæ, omnes dense longeque ciliatæ. *Corolla* albida, 5 lin. longa: labium superius purpureo-maculatum.—In provincia Goensi, ad pedem montium Syhadree; fl. Jan. *L. Ceylanicæ* valde affinis, sed differt foliis hirsutis et minoribus.

3. L. *rigida*; caule erecto suffruticoso obtuse tetragono pilis mollibus patulis villoso, foliis lineari-lanceolatis basi longe attenuatis complicatis utrinque glanduloso-pubescentibus, spicis in ramulis brevibus terminalibus cylindricis 1–1½ poll. longis basi compositis glanduloso-pubescentibus, bracteis lineari-subulatis, bracteolis linearibus acutis, calycis 4-partiti lacinia dorsali oblonga acuta 3-nervi, anteriore infra medium bifida, lateralibus subulatis, *omnibus spinuloso-mucronatis*.

Suffrutex strictus, 3–4-pedalis, parum ramosus, rigidus. *Folia* coriacea, 3–4 poll. longa, 3–7 lin. lata. *Bracteæ* 5–7 lin. longæ, 1 lin. latæ. *Corolla* luteo-alba, 6 lin. longa: labium superius latum, rotundatum, apice emarginatum, inferius 3-lobatum, lobis integris obtusis subtus pubescentibus; palatum glaberrimum. *Filamenta* valde complanata, antherarum loculi basi ciliati. *Stigma* obtusum.—Crescit in montibus Syhadree, prope Ram Ghaut; fl. temp. frigido.

STROBILANTHES.

1. S. *Warreensis*; caule suffruticoso dichotome ramoso nodoso glabro obtuse tetragono bisulcato, foliis oblongis acuminatis basi in petiolum longe decurrentibus utrinque glabris subcoriaceis margine repando-denticulatis supra confertim lineolatis, spicis in axillis oppositis pedunculatis simplicibus solitariis cernuis, pedunculis medio geniculatis ad nodum bracteatis, *staminibus monadelphis* exsertis, rudimento filamenti quinti.

Folia cum petiolo 6–7 poll. longa, 2 poll. lata, in acumen angustum producta. *Pedunculi* 1 poll. longi, circa medium bibracteati: bracteæ minutæ, caducæ. *Spica* semipollicaris, basi bibracteata, circiter 12-flora: floribus quadriseriatis. *Bracteæ* florales sub quoque calyce 3, herbaceæ, carnosulæ, anterior oblonga, 2 lin. longa, laterales lineares, acutæ, 1½ lin. longæ. *Calyx* 2½ lin. longus, hyalinus, ultra medium 5-fidus, segmentis lineari-subulatis setaceo-mucronatis 3-nervibus. *Corolla* 5 lin. longa, alba: tubus parte inferiore cylindricus, superiore subito inflato-infundibuliformis; limbi segmenta æqualia, rotundata, basi purpureo-maculata. *Stamina* exserta omnia basi membrana a basi corollæ decurrente utrinque barbata conjuncta. *Stylus* staminibus longior, apice incurvus, edentatus. *Antheræ* pupureæ, lineares, loculi approximati.—Crescit in regno Warreensi; fl. temp. frigido.

2. S. *tetrapterus*; fruticosus, subscandens, glaber, foliis ovalibus apice breve acuminatis basi in petiolum caulemque secus decurrentibus crenatis coriaceis supra nitidis, spicis axillaribus oppositis et terminalibus solitariis pedunculatis, bracteis herbaceis rhombeo-cuneatis longe cuspidato-mucronatis ciliatis, corollæ bilabiatæ laciniis superioribus altius conjunctis reflexis.

Frutex debilis, 8–10-pedalis. *Folia* 9–10 poll. longa, 3 poll. lata, utrinque densissime lineolata. *Spica* in pedunculo subpollicari tetraptero pollicaris, squamosa, ad basim foliosa, floribus oppositis decussatis. *Bracteæ* dense quadrifariam imbricatæ, apice squarroso-patulæ. *Bracteolæ* lanceolatæ, longe acuminatæ, ciliatæ. *Calyx* ad medium 5-fidus, segmentis acuminatis. *Corolla* alba, pollicaris, pubescens, tubo cylindrico subito in faucem campanulatam transeunte, laciniis ciliatis apice emarginatis. *Filamenta* barbata, exserta: exteriora sublibera, interiora basi membrana conjuncta; rudimentum *quinti glandulæforme*.—Crescit in regno Warreensi; fl. temp. frigido.

ENDOPOGON.

E. *integrifolius*; foliis anguste ellipticis vel lanceolatis acuminatis in petiolum alatim decurrentibus auriculatis, bracteis bracteolisque linearibus pilis longis ciliatis calycem subæquantibus, calyce rachique brevi tetragono viscoso-glandulosis.

Caulis suffruticosus, 3–4-pedalis, ramosissimus, teres, glaber. *Spicæ* terminales et axillares, simplices, vel trichotome compositæ: flores oppositæ, sessiles, decussati. *Calyx* fere ad basim 5-partitus, segmentis linearibus obtusis 3½ lin. longis. *Corollæ* tubus longus, parte inferiore gracilis et cylindricus, superiore infundibuliformis: limbi segmenta æqualia, rotundata. *Stamina* 4, medio tubo inserta, didynama, filamenta basi per paria conjuncta. *Stigma* compressum, apice obtusum, obliquum, basi denticulo auctum. *Corolla* 2-pollicaris, æstivatione convolute imbricata. *Stylus* intra barbam conditus.—Crescit in Concano; fl. temp. frigido.

RUELLIA.

R. *ebracteata*; caule herbaceo repente ad nodos radicante, foliis ovato-rotundatis basi truncatis grosse crenatis pilis articulatis hirtis longiusculc petiolatis, supremis (floralibus) viscoso-glandulosis, floribus in foliorum superiorum axillis solitariis vel geminis sessilibus, capsula octosperma.

Folia cum petiolo (8 lin.) 2 poll. longa, 1 poll. lata. *Calyx* glanduloso-pubescens, ebracteatus, 3–3½ lin. longus, ad medium 5-fidus, laciniis lineari-subulatis, superiore longiore. *Corolla* 8 lin. longa, laciniis rotundatis. *Stamina* 4: filamenta in canalem decurrentem, apice utrinque barbatum, stylum includentem, conniventia, *ut in genere Endopogone*; antheræ biloculares, loculi glabri, basi acuti.—Crescit raro in Concano septentrionali sub arboribus; fl. temp. frigido.

This, and the *R. elegans*, Bot. Mag., 3389, (which has by some mistake been considered by N. ab Esenbeck as identical with his *Hemigraphis*, but which is certainly a *Ruellia*,) are the only two species I have ever met with in this part of the peninsula. The capsule is 4 lines long; the seeds appear glabrous, but, when moistened with water, the closely-adpressed hairs with which they are covered rise up, instantly bristling in all directions. These hairs are simple, transparent tubes, with a simple spiral fibre throughout their length, like those mentioned by Kippist in vol. xix. of the Linn. Trans.

HYPŒSTES.

H. *lanata*; suffruticosa, caule glabro geniculato adscendente, foliis lanceolatis acuminatis integris supra parce hispidulis subtus glabris margine ciliolatis, inflorescentia axillari terminalique foliosa trichotomo-spicata lanato-tomentosa, capitulis uni- bi- vel trifloris in foliorum floralium axillis oppositis solitariis sessilibus vel in apice ramuli brevis ternis capitato-congestis, involucro communi diphyllo foliolis linearibus subæqualibus oppositis planis ima basi connatis glanduloso-pubescentibus calyce duplo longioribus, involucro partiali (sub quoque calyce) diphyllo, foliolis subulatis calyce paulo longioribus.

Folia breve petiolata, 4–5 poll. longa, 2–2½ lata. *Calyx* 3 lin. longus, 5-fidus vel (laciniis duobus superioribus altius conjunctis vel in unum coalitis) 4-fidus: laciniis subulatis, uninervibus. *Corolla* resupinata, pollicaris, extus pubescens: labium superius ligulatum, obtusum, inferius oblongum, basi purpureo-maculatum, apice trilobum, lobis æqualibus. *Filamenta* pubescentia, purpurea; antheræ luteæ. *Capituli flores* 1–2, semper abortivi.—Crescit raro in sylvis umbrosis Concanensibus; fl. temp. frigido.

Nat. Ord. COMPOSITÆ.

Callistephus.

C. *concolor*; radice lignosa perenni e basi divaricato-ramosa glauca, ramis foliolis adscendentibus brevibus puberulis, pedunculis ad apices ramorum solitariis monocephalis, foliis radicalibus oblongo-obovatis apicem versus obtuse serratis vel dentatis, caulinis lineari-oblongis basim versus angustioribus dentatis v. integris omnibus utrinque glanduloso-punctatis glabris v. minute puberulis, involucri squamis exterioribus linearibus obtusis interioribus paulo brevioribus erectis foliaceis dorso glanduloso-punctatis, interioribus linearibus acutis ciliatis.

Antheræ setaceo-caudatæ: pappus exterior coronæformis, pappi interioris setæ 5, scabræ. *Ligulæ* flavæ, 4-nerves, subtus glandulis breviter stipitatis nitentibus conspersæ. *Achænia* cylindrica, teretia, pilis adpressis hispidula.—*Herba* 4–6-pollicaris. In rupibus prope Malwan; fl. Sept. et Oct.

Tribe Ethulieæ.

Adenoon. Genus novum.

Capitulum multiflorum, æqualiflorum. *Involucrum* imbricatum, teres, squamis cartilagineis hirsutis mucronatis trinervibus glandulosis. *Receptaculum* planum, alveolatum, fimbrilliferum. *Corolla* regularis, tubulosa, limbo 5-fido, laciniis linearibus acutis, tubo parce arachnoideo, sub-3-plo brevioribus. *Antheræ* subexsertæ; filamenta brevia. *Stylus* basi glandula cupuliformi cinctus, ramis subulatis exsertis. *Achænium* cylindraceum, apice truncatum, glabrum, 10-sulcatum, glandulosum. *Pappus* 0.—Herba *erecta, ramosa, sesquipedalis*; caule *angulato, scabro, hispido*; foliis *alternis sessilibus, late ellipticis, utrinque acutis, grosse serratis, pilis articulatis bulbosis scabridis, glandulosis*; capitulis *pedunculatis, corymboso-paniculatis.* Flores *cærulei.* Folia 2–2½ *poll. longa,* 1–1½ *lata.*

A. *Indicum.*

Crescit in montibus Syhadree, prope Phonda Ghaut; fl. Sept. Every part of this plant, including corolla and anthers, is covered with white, smooth, oval glands, like the eggs of some insects.

(*To be continued.*)

Appendix to the ‘SPICILEGIA GORGONEA,’ *published in the* ‘FLORA OF THE NIGER EXPEDITION’; *by* P. B. WEBB, Esq.

(*Continued from p.* 313.)

LEGUMINOSÆ.

65. Tephrosia *anthylloides*, Hochst. A plant of which I believe no description is extant, and which is at once distinguishable from *T. apollinea*, DC., by its much larger and more pubescent leaves, and by its longer and rounder pods, thickly covered with soft down. It is a native of Abyssinia (Schimper!) and Nubia (Kotschy!).

67 *a*. Æschynomene *macropoda*, DC. This plant, a native of Senegal, which Mr. Bentham (Fl. Nigr., p. 302) believes to be a form of *Æ. Indica*, Linn., is to be added to our flora.

68. Desmodium *axillare*, Rich. Considered in the Spic. Gorg. as a form of *Desmodium tortuosum*, Sw. Many specimens exist in our present collection; and it will, perhaps, be more prudent to retain it under the above name, until the whole groupe shall have been studied. At any rate, the *D. ospriostreblum*, Steud., appears to be a distinct species, and must be considered as a synonym of this plant.

78 *a*. Rhynchosia *Bocandeana*, sp. n. Apparently an undescribed species. Its nearest congener seems to be *R. medicaginea*, DC., and it enters, therefore, into the section *Eurhynchosia* of Wight and Arnott; we give a technical description of it below.*

78 *b*. Lonchocarpus *Formosianus*, DC. This is a small tree, about twenty to twenty-five feet high, a native of Western Africa beneath the tropics, extending from Senegal to Guinea. It appears sufficiently distinct from *Lonchocarpus sericeus*, H.B.K., to which it has been likened. It approaches nearer to *L. Domingensis*, DC., whose flowers are said to be red: those of this elegant tree are rose-coloured. It may have been cultivated originally in the Cape de Verd islands, on account of the beauty of its flowers; it is, however, now found wild.

78 *a*. Rhynchosia . . . . . A species nearly allied to *R. Caribæa*, but without fruit.

* R. caule tereti, retrorsum piloso; foliolis amplis, coriaceis, viridibus, utrinque pilosulis, subtus reticulatis, eglandulosis, lateralibus inæquilateris subtriangularibus basi cuneatis, impari rhomboideo, stipulis parvis pilosis; racemis axillaribus, 2–3 ex eadem axilla, simplicibus, folio duplo triplove longioribus, subnovemfloris; floribus remotis, calyce hirsuto, bilabiato, labio superiore bidentato, inferiore trifido, laciniis lanceolatis acutis, infero angustiore longiore; corolla decidua, vexillo extus hirtulo, eglanduloso, alas excedente; legumine (juniore) acinaciformi. pubescente, dispermo.

78 *b*. Erythrina *Senegalensis*, DC. An elegant shrub, already found on the promontory of Cape Verd, and now in our present collection from the islands.

79 *a*. Cæsalpinia *pulcherrima*, Sw. This plant, the beauty of whose flowers has spread it throughout the tropical world, must likewise be added to our list.

79 *b*. Guilandina *Bonduc*, L. A ubiquitous plant, found on the burning shores of the tropic in both hemispheres, and which may, perhaps, be considered, as has been observed of the Cocoa Palm, as one of the few plants which migrates, or has migrated, through the agency of the Atlantic and Pacific currents. But I believe that M. Alphonse de Candolle has no direct evidence in regard to the migration of this plant as he has of the Cocoa. Its seeds are exceedingly hard, and probably tenacious of vitality.

79 *c*. Cassia *fistula*, L. This plant, which is a native of the East, but cultivated in America, and probably in Africa, has escaped from plantations, and become spontaneous in the Cape de Verd islands, as elsewhere.

81 *a*. Cassia *Thora*, L. This species, common throughout the tropics, has likewise been sent.

85 *a*. Tamarindus *Indica*, L. This tree, cultivated in Africa and America, has, perhaps, become wild in the Cape de Verd islands.

85 *b*. Afzelia . . . . . A single specimen, in a very imperfect state, being without flowers or fruit, may be referred, not without great doubt, to the above African genus. The young branch which has been sent is thickish and stout, and slightly covered, as well as the footstalks of the leaves, with a short upright rusty down. The leaves are alternate, abruptly pinnate, with two pair of leaflets. The common petiole measures scarcely two inches in length, those of the leaflets from two to three lines. The leaflets are lance-shaped, somewhat rounded at the base, and tapering to a point at the summit, marginated, and, at times, slightly falcate; they are entire, somewhat undulated, like bay-leaves, at the edges, very coriaceous, with divergent veins and numerous strong nervous reticulations both on their upper and under surface. They are perfectly smooth and shining, and above of a deep green. The upper pair are about four or five inches long and two inches broad, the lower slightly smaller, and somewhat more egg-shaped. This may, perhaps, be the little-known *Pancovia bijuga* of

Willdenow, which Sir J. E. Smith places under *Afzelia*, or it may be found to belong to one of the neighbouring genera *Authonota*, *Berlinia*, or *Cynometra*.

86 *a*. Desmanthus *virgatus*, Willd. This, which forms part of our collection, is not mentioned as occurring elsewhere on the west coast of tropical Africa. It is found plentifully throughout the West Indies, and has probably been introduced into the Cape de Verd islands.

89 *a*. Acacia *Arabica*, Willd., *a tomentosa*, Benth. A fragment of this tree, which produces a red gum of no commercial value, and which, under a variety of forms, is found both in Africa and Asia, occurs in our present collection.

89 *b*. Dialium *anomalum*, sp. nov.* This singular plant, though it differs essentially from the species of Willdenow and Afzelius, *D. Guineense* (*D. nitidum*, Guillem. et Serr.) yet must necessarily appertain to the same group, whose generic character may be easily modified to admit it. The *D. Guineense* varies much in the number of its floral appendages, but never to the extent of the present species, as may be seen by the description below. The common type of the flower of *D. Guineense* is that given in the 'Flora of Senegambia,' but from the inspection of several flowers from specimens in the herbarium of Mr. Gay, I find that the so-called petal is frequently wanting, and the ovary is then opposed to a void space as it is frequently in our plant,

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* Arbor? Viridensis. *Rami* . . . . . *Folia* . . . . . *Panicula* intricata, cymosa, ramosissima, axillaris? ramulis divaricatis sæpissime incurvis floribundis, stomatibus crebris verruculosis. *Pedunculi* communes divaricato-cymosi, uti pedicelli breviter ferrugineo-pubescentes. *Bracteæ* parvæ, latæ, squamæformes, caducissimæ. *Flores* mediocres. *Calyx* 5-fidus, coriaceus, intus extusque puberulus, laciniis oblongo-lanceolatis apice incrassatis subacutis caducis. *Torus* in fundo calycis, crassus, persistens, pubescens, coloratus. *Corolla* nulla nisi pro petalo habendum staminodium. *Stamina* nunc in floribus lateralibus 2, opposita, laciniis calycinis longiora, quorum unum laciniæ calycinæ oppositum, alterum intervallo interjecto laciniis 2 alternat, nunc in floribus terminalibus 3, quorum tertium inter 2 priora intercalatum et cum laciniis 2 alterna, unde trium duo proxima videntur et quasi geminata ad basim laciniæ ejusdem et prope marginem ejus utrinque inserta. *Stamen* intermedium sæpe in staminodium crassum stipitatum conversum, aliquando fit petaloideum, sed semper crassum et evenium: quandoque in floribus perfectioribus stamina 4, 2 tum collateralia ad marginem laciniæ utrinque inserta, 1 iis oppositum, et quartum abortivum inter stamen solitare et collateralium adelphium positum. *Ovarium*, vel 1, ovatum, velutino-pubescens, stipitatum, staminibus ventre, dorso laciniæ calycinæ oppositum, in stylum glabrescentem, supra spatium vacuum inter stamina 2, vel supra stamen seu staminodium internodium, deflexum; vel aliquando ovaria 2, inter se opposita, dorsis cum laciniis calycinis alternantia, lateribus ad staminum cohortem conversis. *Ovula* 2, ad ovarii dorsum superposita. *Fructus* ignotus.

and so likewise at other times a perfect stamen occupies the place of the petal: on that account it may, perhaps, be better to consider this accessory organ as a staminode or abortive stamen. In the Senegambian plant it is thinner and more developed and petaloidal than it ever becomes in ours. In *D. Guineense* I never met with four stamens, as in our species, nor has it ever two ovaria, which occur not very sparingly in the Cape de Verd plant. I have not been able to examine flowers of *D. discolor*, Hook. fil. Fl. Nigr. p. 329; but as Mr. Bentham describes them as containing two petals instead of one, and the stamens as very short, I am unable to refer the present plant to that species. Our plant is probably a tree throwing out lateral panicles from its axillæ after equinoctial rains, before the development of the leaves, as none have been sent.

(*To be continued.*)

BOTANICAL INFORMATION.

Note on STILBACEÆ; *by* DR. BENJAMIN CLARKE.

CHARACTER.—*Shrubs*, having strictly the habit of *Ericaceæ* and *Epacrideæ*, with exstipulate *leaves*, from three to six in a whorl, but showing sometimes a tendency to become alternate. *Flowers* in dense spikes, each with three bracts at its base; frequently polygamous. *Sepals* from two to five, distinct and imbricated, or united into a tube. *Corolla* monopetalous, its orifice, and occasionally the *limb*, densely hairy: the *limb* 5-parted, rarely 4-parted. (*Female flowers* apetalous?) *Stamens* four, inserted between the lobes of the corolla, the posterior stamen being abortive or rudimentary. *Anthers* oblong or kidney-shaped. *Ovary* superior, 2-celled, or 1-celled from retraction of the dissepiment; the two cells thus merging into one. The *cells* equal or unequal; the larger cell posterior, rarely anterior. Each cell with one erect anatropal *ovule*, when the cells are of equal size; the smaller cell frequently empty. *Style* long and filiform. *Stigma* bifid. *Fruit* dehiscent or indehiscent; the dehiscence being septicidal, and the valves completely separating from each other, and again splitting at the back to a distance of about one-third of their length from the apex;

Fitch del et lith

Frederic Reeve imp

Brayera ánthelmintica.

(Kosso.)

1-seeded, the fertile *cell* being posterior, rarely anterior; less frequently 2-seeded. *Seed* with a minutely-pitted testa.

AFFINITIES.—Nearest to *Diapensiaceæ*; the stamens being inserted between the petals as in that Order, and the anther-lobes of *Campylostachys abbreviata*, diverging nearly in the same manner as in *Pyxidanthera*. As the stamens are interpetalous, these Orders should probably be associated with some monopetalous groupe which show a tendency to become polypetalous; and their structure differs but little from that of the Orders of the Erical alliance, resembling them especially in their bracts and calyx. Should the female flowers prove to be really apetalous, as they appear to be, *Stilbaceæ* may possibly be a connecting link between *Epacrideæ* and *Empetraceæ*.

On the KOOSO, *or* BRAYERA ANTHELMINTICA.

(*With a Plate*, TAB. X.)

It is not my intention to discuss the medical properties of the plant here represented: they will be found amply treated of in the July number (1850) of the 'Pharmaceutical Journal,' by Dr. Pareira. My attention was called to the plant by W. White Cooper, Esq., of Berkeley Square, as one that has proved, beyond all doubt, to be a specific for tape-worm, and more speedy than any other known remedy. At St. Thomas's Hospital it has been pretty extensively used, and the cases reported in the medical journals.

As I fortunately possessed beautiful specimens of this plant in my herbarium, from the "Unio Itineraria," gathered by Dr. Schimper, in Abyssinia, I have thought a representation of the plant could not be unacceptable both to the botanist and to the medical practitioner. Bruce's figure is nothing to boast of; and the plate in the Dict. des Sc. Nat. only gives the analysis of the flowers.

Nat. Ord. ROSACEÆ. Tribe DRYADEÆ.

BRAYERA, *Kth.*

GEN. CHAR. *Calyx tubo* basi bibracteolato turbinato, fauce intus annulo membranaceo constricta, limbi decempartiti laciniis biseriatis, quinque exterioribus multo majoribus oblongo-lanceolatis obtusis reticulato-venosis stellatim patentibus, quinque interioribus alternis minoribus spathulatis. *Corollæ petala* 5, calycis fauci inserta, minima linearia. *Stamina* circiter viginti, cum petalis inserta; *filamenta* libera, inæquilonga, *antheræ* biloculares, longitudinaliter dehiscentes. *Ovaria* 2, fundo calycis insidentia, libera, unilocularia, *ovulo* unico, v. geminis, pendulis. *Styli* terminales, e calycis fauce exserti, sursum incrassati; *stigmata* subpeltatim dilatata, crenato-lobata. *Fructus?*

Arbor *Abyssinica, sexagintapedalis, ob vires anthelminticas celebris, ramulis tomentoso-villosis*, foliorum *delapsorum cicatricibus annulatis*, foliis *confertim alternis et interrupte imparipinnatis*, foliolis *oblongis, serratis, margine et nervis subtus villosis*, stipulis *petiolo basi dilatata semiamplexicauli adnatis*, floribus *in cymas repetite dichotomis, divaricato-flexuosis, pedicellis basi bractea ovata stipatis. Endl.*

Brayera anthelmintica, Kunth, in Brayer Notic. in vol. viii. 1804; Dict. Class. d'Hist. Nat. vol. ii. p. 501, cum Ic. flor.; De Cand. Prodr. vol. ii. p. 588; Schimp. It. Abyss. Dict. 2de ed. n. 920.

Cusso vel *Banksia Abyssinica*, Bruce It. ed. 8vo. vol. vii. p. 181. Atl. t. 22 et 23.

Hagenia Abyssinica, Willd. Sp. Pl. ed. 2. p. 331.

HAB. The high country of Abyssinia, Bruce. Ad pagum Dendera in districtu Urahat, provinciæ Tigrensis Agama. 1838. *Schimper.*

Only one species is known to botanists. In the above definition of the genus, the character seems very correctly drawn, but our specimens are evidently either diœcious or polygamous, we think the former. Out of our two specimens, one has all the flowers as represented at our figs. 3, 4, and 5 (clearly female); the other as at figs. 6, 7, and 8 (male flowers). The great Abyssinian traveller, Bruce, appears to have been the first to have brought the virtues of this plant into notice. He says, in his Travels, "The *Cusso* (De Candolle calls it *Cotz*, or *Cabotz*) is one of the most beautiful of Abyssinian trees,—among the most useful, too. I never saw it in the Kolla, or Arabia, or in any other part of Asia and Africa. It is an instance of the wisdom of Providence, that the range of this tree does not extend beyond the limits of that disease, of which it seems designed to be the cure.

"The Abyssinians of both sexes, and at all ages, are troubled with a dreadful complaint, which habit, however, enables them to bear with a kind of indifference. Every individual, once a month, evacuates a large number of worms; not the tape-worms, nor the kind which troubles children, but of the sort called *Ascarides.* The method of promoting these evacuations is by infusing a handfull of dry *Cusso* flowers in about two English quarts of Bouza, or the beer they make from Teff. After being steeped all night, the liquid is fit the next morning for use. While the patient is taking the *Cusso*, he makes a point of being invisible to his friends, and continues at home from morning till night. Such was the practice of the Egyptians, after using a particular medicine. It is alleged that the want of this drug is the reason why the Abyssinians do not travel; or if they do, most of them are short-lived. Gentle, safe, and efficacious as the *Cusso* is in its native country, I cannot doubt that the superior skill of our physicians would turn it to the advantage of mankind in general, were it known in Europe."

VICTORIA REGINÆ.

Under the head of *Amherstia nobilis*, at p. 315 of this volume, we incidentally noticed the fact of seeds of *Victoria Reginæ* having been transmitted from England to India, with the view of adorning the tanks of that country with this most glorious aquatic. We have now the pleasure of stating, that from seeds sent out by the Royal Gardens of Kew, to Trinidad, to Mr. Purdie, Curator of the Botanic Garden, plants were reared and flourished, and from thence we are now importing well-ripened seeds, which we are distributing in Ceylon, and to the hothouses of North America.

In the Royal Gardens our plants are still (October) in the most flourishing condition. From them in part, and in part from the splendid specimens at Syon, a fasciculus of four imperial folio, highly-coloured plates, with accompanying description, is preparing by Messrs. Reeve and Benham (the drawings and lithographs by Mr. Fitch), which is nearly ready for publication.

MR. SPRUCE'S *Dried Plants of the Amazon.*

The second distribution of the valuable collections of Mr. Spruce, made on the Amazon and its tributaries, is in progress. Our own set has been received, and we have the pleasure of being able to say that the specimens are mostly from Santarem, for the greater part either new or very rare, in excellent condition (and Mr. Spruce furnishes samples with no niggardly hand); and, what adds vastly to their value, they are named by Mr. Bentham, who has generously undertaken this laborious task for the entire of Mr. Spruce's phænogamous plants.

NOTICES OF BOOKS.

Fasciculus II. of the SIKKIM RHODODENDRONS.

The whole of the plates (ten) for the second fasciculus of the Rhododendrons of Sikkim Himalaya are prepared, and will soon be published by Messrs. Reeve and Benham. So rich is that country in Rhododendrons, that Dr. Hooker, by his single personal researches, has discovered species enough to furnish a third fasciculus (of the same number of plates), and all of equal interest with those given in the first.

GRIFFITH, *the late* WILLIAM, F.L.S., *&c., &c.*: POSTHUMOUS PAPERS *bequeathed to the Honourable the East India Company, &c.*

Having already given a general notice of this important work, and of the early volumes which appeared, we have only now to state that we have received from the Directors of the Honourable the East India Company:—

1. Vol. II., 8vo, entitled 'Itinerary notes of Plants collected in the Khasyah and Boutan Mountains, 1837–38, in Affghanistan and neighbouring countries, 1839–41,' accompanied by a Map of India, illustrating the travels of the late William Griffiths, as described in his Journals and the localities of the Griffithian Herbaria, bequeathed to the Honourable the Court of Directors of the E. I. C.
2. Part II. of the 'Notulæ ad Plantas Asiaticas,' 8vo; viz. 'On the Higher Cryptogamous Plants.' This latter is accompanied by
3. An Atlas in large 4to, entitled 'Icones Plantarum Asiaticarum,' Part II. including coloured Plates, Tab. 63–138.

These works will be of great value to those who are privileged to partake of the Griffithian Herbarium, now in the course of distribution by the liberality of the E. I. C. They display in an eminent degree the botanical industry of the author; but we lament to see every page disfigured by the repeated and the grossest misspelling and misprints, which might easily have been avoided.

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Fitch lith.

Reeve & Nichols imp.

Report on the "BROWN SCALE," *or* COCCUS,* *so injurious to the* COFFEE-PLANTS *in Ceylon; in a letter from the late* GEORGE GARDNER, Esq., *Director of the Botanic Garden at Peradenia, addressed to the Colonial Secretary, Colombo.* (Communicated by the Right Hon. Earl Grey, Chief Secretary for the Colonies. With a Plate, TAB. XII.)

SIR,—Agreeably to the instructions contained in your letter to me of the 12th ult., I have the honour to inform you that I have visited the Coffee districts therein mentioned, and collected such information as I have been able to gain regarding the nature, history, and effects of the "Brown Scale," or "Bug," which for some years has been infesting the Coffee estates of the Central Province, and now beg to lay before you, for the information of His Excellency the Governor, the following report.

As it would be impossible to understand thoroughly the effects which the insect produces without a knowledge of its structure and functions, I shall, in the first instance, detail these, at least so much of them as I have been able to verify.

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* *Being anxious, if possible, to publish the name of this insect, I applied to* J. E. Gray, Esq., of the British Museum, to whom I sent the drawing. That gentleman most kindly gave me the following information :—

"I believe that the *Coccus* of the Coffee-tree is as yet unnamed in the scientific catalogues. Ledermüller, in his 'Nachlehre seiner mikroskopischen Gemüths und Augen-ergötzung,' 1762 (p. 16–20, t. 9, f. 1, 2), has described and figured an insect found on the Coffee-tree, which evidently belongs to the same family, but not to the same genus, and is probably identical with the *Coccus* of the Orange-tree (*C. hesperidum*). He observed that the Coffee-tree up to that time had been regarded as 'ein reiner und keischer Baum.'

"M. J. F. Charpentier (Cossigny, 'Moyens d'Amélioration des Colonies,' 8vo, 1802, vol. ii. p. 144) observes :—'Les Arabes attachent aux pieds des cafiers une petite bande de toile, large de deux ou trois doigts, imbibée d'une huile particulière ; ils ont vraisemblablement l'intention d'éloigner les insectes par ce moyen. Dans les Iles Africaines, nous avons vu périr plus d'une fois les cafiers, et même d'autres arbres, qui étoient couverts d'insectes blancs, qu'on nommoit *Poux*, et qui avoient un duvet très-fin, assez semblable a celui de la cochinelle.' At vol. iii. p. 371, he observes :—L'auteur avance que la naissance et la multiplication des pucerons blancs, qui détruisent quelquefois les cafeières, sont dues à l'étêtement des arbres : il ne formoit aucune preuve de cette assertion hasardée. Les arbres qui n'ont pas été étêtés n'en sont pas plus exempts que les autres : d'ailleurs, il y a cinquante ans que ces pucerons existèrent à l'Ile de la Réunion : ils détruisèrent alors la plus grande partie des cafiers de la Colonie : depuis cette époque, les habitants ont continué d'étêter les cafiers, et cette maladie n'a pas reparu,' &c.

"Mr. Adam White informs me, that about three or four months ago, Professor Goodsir had this *Coccus* sent to him, and an account of it was probably read at one of the Edinburgh Societies."

Mr. Westwood considers that two distinct species of *Coccus* are represented in Mr. Gardner's drawing, and refers me to 'The Gardeners' Chronicle' of Oct. 7, 1848, for observations on the *Coccus* of the Coffee-plant; but there is nothing relating to the particular species of *Coccus*, simply an extract from Mr. Gardner's Report, which had then recently been received at the Colonial Office.

The first thing that attracts attention, on looking at a Coffee-tree which has for some time been infested with the "bug," is the number of brownish-coloured wart-like bodies that stud the young shoots, and occasionally the margins of the under-side of the leaves. Each of these marks, or scales, is a transformed female "bug," containing a large number of eggs, which are hatched within it. When the young ones come out from their nest they run about over the plant, looking very much like small woodlice; and at this period of their lives there is no distinction between the male and the female.

Shortly after being hatched the males generally seek the under-side of the leaves, while the females prefer the young shoots as a place of abode. In these localities they attach themselves to the cuticle of the plant, for the purpose of undergoing certain transformations, which, being different in the two sexes, require to be described separately.

If the under surface of a young leaf of an infected Coffee-tree be examined with the naked eye, it will be found to be studded, more or less thickly, particularly on its lower half, with minute yellowish-white coloured specks, of an oblong form. These are the larvæ of the males being transformed into *pupæ* beneath their own skin. Some of these specks are always in a more perfect state than others, the full-grown ones being of a whitish colour, and scarcely a line long. Of those which are of this size, some have a much more translucent appearance than others, and, if examined with a magnifier, will be found to be empty, the perfect animal having made its escape; but if the darker-coloured ones are examined in the same manner, the nearly perfect insect will be found within it. In this state the animal is of an oblong form, of a yellowish colour, with the rudiment of a wing on each side attached to the lower part of the thorax, and closely applied to the sides. It has six legs, the four hind ones being directed backwards, and the two anterior ones forwards. It has two antennæ, which are directed backwards; and from the tail protrude three short bristles, the central one of which is both thicker and longer than the other two.

When the transformation has been completed, and the insect has reached maturity, it makes its way out from beneath the pellucid case by which it was covered. All its organs have then attained their full size. The head is of a somewhat globular form, with two rather prominent black eyes in front, and two long antennæ, each with eleven joints, hairy throughout, and with a tuft of a few longer hairs at their apices. The legs are also hairy. The wings are horizontal, of an obovate-oblong shape, membranous, and a little longer than the bristles of the tail. They have only two nerves, neither of which reaches so far as the tips. One of them runs close to the external margin, and is much thicker than the other, which runs at some distance from the internal margin. Being possessed of wings, the full-grown male is much less seldom seen on the Coffee-bushes than the female.

The female, like the male, attaches herself to the surface of the plant, the place selected being usually the young shoots; but she is also to be met with on the margins of the under-side of the leaves. On the upper surface neither male nor female can attach themselves. But unlike the male, which derives no nourishment from the juices of the plant, the female, as soon as she has fixed herself, punctures the cuticle with a proboscis on her chest, by which she abstracts the juices that nourish her. In the early pupa state of the female, she is easily distinguished from the male by being more elliptical and much more convex.

As she increases in size, the skin extends and becomes smooth and dry, the rings of the body are effaced, and, losing entirely the form of an insect, she has for some time a yellowish pustular-like shape, but ultimately assumes a roundish-conical form, and a dark brown colour, until she has reached nearly the full size. She still possesses the power of locomotion, and her six feet are easily distinguishable on the under surface of her corpulent body; but at no period of her existence has she wings.

It is about the period of attaining her full size that impregnation takes place; after which the scale becomes somewhat more conical, assumes a darker colour, and becomes permanently fixed to the surface of the plant by means of a cottony substance interposed between it and the cuticle to which it adheres.

The scale, when full grown, exactly resembles, in miniature, the hat of a Cornish miner, there being a narrow rim at the base, which gives increased surface for attachment. It is about one line and a half in diameter, by about one line deep, and appears perfectly smooth to the naked eye, but when examined with a powerful magnifier, it is found to be studded with very minute warts, which at first sight give it a dotted appearance. It is entirely destitute of hairs, except the margin of the rim, which is ciliated.

The number of eggs contained in one of these scales is prodigious, amounting, in one which I counted, to no less than 691. The eggs are oblong, of a pale flesh-colour, and perfectly smooth. In some of the scales which I have examined, the eggs had just been hatched, and, when laid on the field of the microscope, exactly resembled those masses of life so often seen in old dry cheeses.*

The insect, I find, belongs to the genus *Coccus*, and is, therefore, a congener of that which produces the cochineal of commerce. So far as the only books † within my reach enable me to judge, it seems to be the *Coccus adonidum* of Linnæus, which he mentions as being common on evergreen trees in Asia, such as the *Camellia*, &c. He gives no description of the male, but his character of the female agrees pretty well with the Coffee one, except in being less conical in the scale state. If not the same, it is a very nearly allied species.

It is not till after the pest has existed on an estate for two or three years that it shows itself to any alarming extent. During the first year only a few of the ripe scales are seen scattered over the bushes, generally on the younger shoots, sometimes on the margins of the under-side of the leaves, but, should the trees be in bearing, most commonly on the footstalks of the berries. The crop this season does not suffer much, and the appearance of the tree is scarcely altered. The following year, however, brings a change for the worse. The scales are found to have become more numerous, and if the young shoots and the under sides of the leaves are examined, they will be found to be covered with numberless white specks, which prove to be the young scales in a more or less forward state. The clusters of berries have assumed a black smutty appearance, have a more numerous crop of scales than during the previous year, and, if the clusters are watched, it will be found that a number of their berries fall off before coming to maturity. The general health of the tree now also begins to fail, and it acquires a blighted appearance; a slight loss of crop is sustained, but not to any extent.

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* One or more small yellow maggots are sometimes found mixed with the eggs, which are, no doubt, the larvæ of some other insect, the eggs of which had been deposited in the scale when it was soft.

† These are the 13th edition of the 'Systema Naturæ' of Linnæus, in the Garden Library, and Deshayes' and Milne Edwards's edition of Lamarck's 'Animaux sans Vertèbres,' in my own; but the former is now upwards of half a century old, and the latter contains descriptions of only a very few species of *Coccus*. It is much to be wished that the Garden Library contained a good modern work on Entomology.

The third season exhibits a still greater deterioration. The whole plant has then assumed a deep black colour, as if soot had been thrown over it in great quantities. This colour is caused by the growth of a black parasitic fungus on the young shoots and the upper surfaces of the leaves, where it forms a thin fibrous coating, not unlike a piece of velvet or felt. When this substance is examined with a powerful microscope, it is seen to consist of a dense interlaced mesh of fibres, each made up of a single series of minute oblong vesicles applied end to end. This fungus, I find, belongs to the genus *Antennaria*, and believe it to be an undescribed species. It never makes its appearance on the tree till after the *Coccus*, or "bug," has been a long time on it, and is, no doubt, produced by the unhealthy state to which the plant has been reduced, owing to the vitiation of its juices by the insect: as certainly as the "scale" never appears on the upper surface of the leaf, so surely does the *Antennaria* never appear on the under one.

At this period the young shoots have an exceedingly disgusting look, from the dense mass of yellowish pustular-like scales that are forming on them. The leaves, in consequence of the abstraction of their juices, alike by the animal and the vegetable parasite, become shrivelled and evidently diminished in size; and the trees, which in their healthy state appeared to cover the ground, now seem to stand out singly. On the best trees so infected, about two-thirds of the crop is lost, and on many scarcely a berry is to be seen.

On trees thus diseased, immense numbers of a small black species of ant are found crowding those portions of the plant on which the young scales are most abundant. By the managers of some estates it was suggested to me that there might be some connection between the two animals; but there is nothing further in it than the fact that the ants puncture the scales for the sake of the fluid matter within them, and in this way they no doubt prevent numbers from coming to perfection.

Besides the scale, there is another species of *Coccus* sometimes found on Coffee-trees, but never to the same degree. The female of this kind never changes into a scale, but wraps herself up in a white cottony matter after impregnation, and there producing her eggs, dies. This insect has sometimes been observed in Coffee estates, previous to the appearance of the Scale; but there is evidently no connection between them.

So far as I have been able to ascertain, the Coffee-trees of the island were never affected with the "scale" till the year 1843, when Capt. Robertson first observed it on a few Coffee-bushes on his estate called Lapallagalla. This estate, together with a few others, is situated immediately on the western boundary of the great central mountain range overlooking the country of the Four Korles, and the tract is known by the name of the Muruta district. Since then the pest has been gradually progressing eastward through the Dolishagie, Ambegamoa, Kotmalu, Pusilana, Delotte, Humisgiria, and Kunckles districts, but having only appeared within the last two years in the latter places, its ravages have not yet been so destructive there as in the former ones.

The cause of the first appearance of the scale on the Coffee-bush is variously accounted for. Capt. Robertson's neighbours attribute its first introduction to the island to his having imported it on some Mocha Coffee-plants from Bombay. The superintendent of one of the estates near Captain Robertson's, having first observed it on some vigorous plants near the Coolie lines, ascribed its production to the rich manuring supplied by the Coolies. Others, such as Mr. Anstruther, believe it to be spontaneous in its origin, and assert that bad planting, and allowing water to accumulate about the roots of the plant, has been the original cause of its production.

That the "bug" is considered by the natives to be indigenous to the island, there can be no doubt; but the evidence on which they found their belief does not appear to be sufficiently strong. By Mr. Jayetiteke, of Modliar, Kandy, a most intelligent native, who is passionately devoted to agricultural and horticultural pursuits, I am informed that he has known the "bug" for many years as a pest on the fruit-trees of the native villagers, such as the Guava; but that he has never seen it so widely spread as during the last few years. By Captain Robertson I was likewise informed, that when he pointed it out to the natives, they seemed to be familiar with it. Mr. Little, of the Dahanyke estate, in the Ambegamoa district, told me that he had noticed it abundantly on a Guava-tree near his house, in the year 1843, the same year in which it appeared at Captain Robertson's, and two years before any of his own Coffee-trees became affected. The villagers, he said, were well acquainted with it, and told him that it generally made its appearance every three or four years. I must, however, observe, that I have questioned my head-gardener, and the draughtsman, on the subject; and although both of them have been connected with the Peradenia Garden for the last twenty years, and, consequently, likely either to have seen or heard of such an insect, yet neither of them can remember anything of the "Coffee bug" till within the last few years, though they have long been well acquainted with somewhat similar but very different species, inhabiting other kinds of trees. This is a fact well worthy of being kept in view, as the draughtsman is a person who has a keen eye for distinctions among natural objects, and therefore less likely to be mistaken than common observers, particularly native ones, who most likely have confounded the "Coffee bug" with other kinds well known to be indigenous.

In the course of my present investigations, I have met with a number of nearly allied species of Scale *Coccus* infesting different kinds of trees and plants, some of which have spread this season to a very great extent. Nearly all the Oleanders in the Peradenia Garden are at present overrun with a kind of "scale," which is much larger and flatter than the Coffee one, and which, when near its maturity, becomes enveloped in a tuft of white cottony matter. Its effect on the tree is quite the same as that of the Coffee one, the upper surface of the leaves and the young shoots becoming even more densely covered with the black matter which gives such a dismal look to the plants. The same species also infests the *Thevetia neriifolia* and the Buddhist tree (*Plumeria acuminata*), all of which possess a milky juice; and as yet I have seen it on no other tree. Another species, about the same size as the last, but a little more convex, destitute of cottony substance, but exuding a gummy kind of matter round the part it adheres to, is very common at present on the *Gendarussa vulgaris*—the Kalu-Waeraniya of the Singalese. A much larger species than either of these was pointed out to me on the Hon. Mr. Fortescue's estate, at Kotmalu, inhabiting the leaves of the large green Aloe (*Fourcroya gigantea*). Another kind infests the Jack, another the Mango; and one, different from all, has just been brought to me from Dambool, adhering to the branch of a *Lantana*.

During my recent excursion it was ascertained that the Coffee *Coccus* now exists very abundantly on many other trees, giving them the same aspect and producing similar effects. Thus, I have observed it on the Lime, the Guava, the Myrtle, the Rose, *Careya arborea*, and *Vitex Negundo*,—the two last are common roadside trees. It seems, however, very certain that until within the last five years it has not been known to attack the Coffee-plant. In most of the districts that I have just visited, the Coffee-trees of the villagers were found to be quite as much affected as those on plantations. In the Botanic Garden at Peradenia there is scarcely a tree that is not somewhat infested. It is, therefore, scarcely possible to believe that had the Coffee "bug" been in existence in Ceylon previous to the present epidemic, its effects must have been observed at one period or another on the native Coffee.

Some managers of estates believe it to have been introduced to them on young plants brought from native villages, but, on questioning them, I found that they had no better grounds for their assertion than conjecture. On Mr. Fairholme's estate, at Dimboola, it was first seen, about two years ago, on a single bush in the only part of it that is planted with village plants. The bush was taken up and burned, and no bug has since appeared on that portion of the estate. Had the pest been brought from the village, it is not at all likely that it would have been confined to a single plant.

If, as Mr. Anstruther supposes, the nature of the soil and bad planting have anything to do with its origin, Capt. Robertson's estate of Lapallagalla is one of the most likely I have seen in Ceylon to have given birth to it, or at least to have afforded an excellent field on which to begin its ravages. The soil of it, as well as of nearly all the surrounding estates, is of a very clayey nature, and consequently the holes that were dug for the young plants must have acted like pots without outlets, to retain the moisture that drained into them from the surface; and that they must have been well supplied with moisture is certain, from the fact that the district is one of the most rainy in the island. The roots of the plants must also have found great difficulty in penetrating through the sides of the holes; and, indeed, the whole appearance of the trees shows that matters are not going on well with them at the bottom. Nearly all of them have a lanky look, throw out few or no lateral shoots from their lower branches, and on an average only yield, at the best of times, from four to five cwt. of Coffee per acre, or about one-half of the usual crop of average estates in other districts.

(*To be continued.*)

Letter from Mr. BERTHOLD SEEMANN, *Naturalist of* H.M.S. HERALD'S *Voyage in* 1849 *and* 1850.

(*Continued from p.* 182.)

Of all the States composing the Republic of Mexico, none are less known than Sinaloa, Durango, and Chihuahua. Partly through fear of savage Indians, partly for want of pecuniary means, they have been avoided by almost every traveller; and those authors who have given a general description of the country have treated them vaguely, or confined themselves to enumerating the obstacles which prevented them from investigating this interesting portion of the Mexican confederation. As to botany, and natural history in general, the north-western states are an unexplored field. Few naturalists have ever visited them; and the specimens that have been transmitted to Europe by amateurs have mostly proved new to science. I was, therefore, extremely anxious to visit these regions while the Herald was surveying the southern portion of the Californian Gulf; and when I arrived, in November 1849, at the port of Mazatlan, I lost no time in making preparations for a start.

I left Mazatlan on the 23rd of November, and on the same day reached San Sebastian, a small town, distant about fifty miles. The road, after traversing, for several miles, tiresome Mangrove-swamps, ascended slightly, but became hardly more interesting. It being the dry season, most plants were leafless, and all the herbage burnt up: here and there, indeed, a few evergreen Fig-trees, some *Mimosæ*, and arborescent *Cacti* were seen. Those in flower were still fewer in number. I observed two *Cassias*, an *Acacia*, and the *Ipomœa arborescens*, Don, here termed *Palo blanco*, from its white bark and flower. Nor does it seem that the wet season calls into life a much more varied flora. The soil is very poor;—of which the numerous spiny trees and shrubs, their small dimensions, and the absence of large foliage, give a mournful, but decisive proof.

Having visited San Sebastian in 1848, I remained but a day. The principal employment of the people of this place is cutting Log-wood (*Hæmatoxylon Campechianum*, Linn.), and the cultivation of Maize and Maguei: the latter is grown for the sake of extracting from it the "Aguardiente de Maguei," a highly stupifying beverage. The gardens are full of a tree named Guamuchil (*Pithecolobium dulce*, Benth.), the red fruit of which is boiled and eaten. Besides the fruit, the tree is beneficial in another way: from its bark and the root of the Tabachin (*Poinciana pulcherrima*, Linn.) a decoction is made, which is admitted to be one of the best remedies for curing cutaneous diseases, especially the lepra. For the same malady, the inhabitants of tropical America possess many excellent remedies. In the Isthmus of Panamà they use the leaves of the Malva (*Malachra capitata*, Linn.) and the bark of the Palo de Buba (*Jacaranda Bahamensis*, R. Br.) and that of the Nance (*Brysonema cotinifolia*, H.B.K.). The Malva, however, I consider as one of the most effectual.

The first part of the road from San Sebastian was very monotonous, passing through Maguei plantations, remarkable for their stiff and uncouth appearance. Towards the afternoon I came into a more varied landscape—to the foot of the Andes, or Sierra Madre, as they are called. The oppressive atmosphere of the coast was less felt at every step, the air became cooler and more agreeable to a European constitution, and, although the excessive dryness continued, a few stragglers of the Oak and Fir showed themselves. In the evening of the 26th of November, I reached the village of Copala, and on the following day that of Santa Lucia. Of all the places I have seen in Mexico, none has pleased me more than Santa Lucia. Situated about 4,000 feet above the sea, enjoying throughout the year a temperate climate, it lies in a romantic valley, encircled by elevated mountains, which admit a view of the Pacific Ocean. The houses of the Indians, scattered over an undulated surface, are surrounded by that beautiful vegetation in which the graceful forms of the tropics are harmoniously blended into the flora of the temperate zone. The *Acacia* and *Mimosa* stand in company with the Oak, the Fir, and the *Thalictrum*. Hardy *Umbelliferæ* and *Compositæ* are mixed with *Alstrœmeria*, *Cuphea*, *Tupa*, *Lobelia*, and *Lophospermum*, from which bronze-coloured humming-birds suck the sweet nectar.

Nearly every hedge is overgrown by a splendid creeper, the *Ipomœa Schiedeana*, Ham. Its azure flowers are remarkably large, from four to five inches across, and set so close together that hardly a leaf is to be seen, and the plant resembles a blue sheet, from whence the vernacular name, "Manto de la Virgin," or Cloak of the (Holy) Virgin. There is another plant of great beauty in these parts, the *Poincettia pulcherrima*, now common in European gardens. About Santa Lucia, where it is called Catalina, it grows in damp and shady places. An extract from its bracts mixed with lime-juice gives an excellent scarlet dye. In the city of Durango the same plant is cultivated in every garden, and is there termed "Noche bueno," because it flowers about Christmas (Noche bueno of the Spaniards).

Leaving Santa Lucia I passed Ocotes,—a place deriving its name from the Ocote, a Fir from which pitch is made,—and reached, on the 1st of December, the rancho of Guadalupe, situated about 6,000 feet above the sea. Consisting of porphyry and melted rocks, forming steep mountains, awful precipices and rugged ravines, all covered by a dense forest, the vicinity of Guadalupe gives a fair idea of the Sierra Madre in general. The *Amentaceæ* and *Coniferæ* form the principal part of the vegetation. The most common trees are Oaks, of which the herbarium contains sixteen species; but they have neither the size nor the grandeur of the Oaks of northern Europe. Of *Coniferæ* there are eight, belonging to the genera *Pinus*, *Abies*, *Cupressus*, *Juniperus*, and *Taxodium*. Eminently numerous are the *Ericaceæ*: the genus *Arbutus* alone being represented by eight species, five of which are middle-sized trees, with greenish flowers, three, low shrubs, bearing scarlet blossoms. Families of great extent are the *Compositæ*, *Papilionaceæ*, and *Scrophularineæ*. The *Lobeliaceæ*, *Gentianeæ*, *Œnothereæ*, and *Labiatæ* are less abundant.

Of all the localities in the Sierra, the barancas, or ravines, are the most productive. Near Guadalupe I found in such a place, among many other rare plants, a *Lonicera*, a *Viburnum*, a rooting *Hydrangea*, and a new (?) species of *Cupressus* (no. 2000), vernacularly termed Cedro de la sierra.* It is a tree attaining a height of 100 to 150 feet, whose branches are nearly horizontal, differing in this respect considerably from *C. sempervirens*, Linn. The leaves are small, and smell like those of *Juniperus Sabina*. In habit the Cedro resembles the Tascate, a *Juniperus* (no. 2001) very common throughout the sierra. Both, however, may easily be distinguished by the fruit, and the localities in which they grow. The Cedro only vegetates near running streams, while the Tascate is found in dry places. The genus *Cupressus* having a representative in the Mexican flora, it is remarkable that *C. sempervirens*, cultivated in the gardens, never produces fruit, though plenty of flowers. In order to propagate it, seeds must be procured from Europe.

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* The tree called "Cedro de la tierra caliente" by the Mexicans, is *Cedrela odorata*, Linn.

In ascending towards the top of the sierra the temperature had gradually decreased, but fortunately not fallen to the freezing point. On proceeding, however, everything partook of a wintry aspect, and I became soon aware that my principal harvest was over. At 8,000 feet the Evergreen Oak had disappeared, the Fir being the only tree. Of herbage, nothing remained but brown leaves; and the little streams, which at a lower elevation gave variety to the sylvan scene, were covered with ice one to two inches thick. The nights were bitterly cold, and in vain did I try to get a few hours' sleep: it was impossible, even near the fire. I continued my journey over large plains, passing Cayottes, Salto, Llano grande, Navios, Los Miembres, and Rio Chico, all miserable huts, at which the traveller obtains, at high charges, tortillas de maiz for himself, and a little Indian corn to feed his half-starved animals. To cross these elevated plains during this season is not without danger. The sky, always of an azure-blue, suddenly becomes cloudy, snow begins to fall, and in a short time the traveller is prevented from proceeding. If he is near a hut, his life may be saved; if not, which is very often the case—as human habitations are from twenty to forty miles distant from each other—he and his animals must perish miserably. Many have been lost in this way. I may consider myself fortunate. When leaving the rancho of Navios the heaven was overcast, and hardly had I descended into the plains of Durango when a severe snow-storm discharged itself over the summits of the Sierra Madre.

It would be well were these difficulties the only ones to combat; but there are others of a more serious nature. Nearly in every mile of the road you observe one or more heaps of stones, on the top of which are wooden crosses. Each of these monuments shows the spot where people have been slain by robbers. In some parts they are so numerous that the places look almost like burying-grounds. In other countries, if people meet on a solitary road they are pleased—"Similis simili gaudet;" but here, directly parties descry each other, they count forces, and prepare for an attack. In silence they draw near, the one measuring the other with suspicious eyes till somebody makes the usual salutation, and they proceed to their respective destinations. It is a lamentable state of society when you must look upon every fellow-creature with distrust, and can never move a step without being armed.

When I arrived in the city of Durango, several foreign residents invited me to live with them. Mr. Washington Kerr, an American merchant, having been the first who made me the offer, I took up my residence in his house. Of the hospitality shown me by him, as well as by other foreigners, I cannot say too much. They treated me with the greatest kindness and attention, and I shall always remember them with feelings of the deepest gratitude. Durango is a finely-built town, containing 22,000 inhabitants. It is situated in a large plain about 6,000 feet above the sea, and enjoys a climate which, like that of the greater part of the Mexican highlands, is dry, but agreeable. The extremes of heat and cold are unknown. Towards the end of February the night-frosts cease; the spring commences; Poplars and Willows begin to get green; Peaches and Apricots put forth their blossoms. But the temperature alone, though fast increasing during April and May, is not sufficient to awaken nature altogether. The fields remain dry, till in the latter end of May, or the beginning of June, the vivifying rains set in. In a few days everything has started into life, and the vegetation proceeds with extraordinary quickness. In valleys, on mountains, and in ravines, everywhere Flora celebrates her triumphs. Early in September the rains cease: in October the night-frosts recommence,—except which there is no regular winter, as snow but seldom falls, and never remains long on the ground.

The vicinity of Durango is arid and thinly wooded; indeed, there are but seven species of indigenous trees, namely, a Willow, an *Acacia*, a *Prosopis*, an *Amelanchier*, the *Taxodium distichum*, *Casimiroa edulis*, and *Yucca aloifolia*. These, together with a few shrubby *Acanthaceæ*, *Compositæ*, *Scrophularineæ*, and *Cacteæ*, and the everywhere-prevailing *Agaves*, constitute the winter flora of Durango. Of *Cacteæ*, the immediate neighbourhood offers three *Opuntias*, two *Echinocacti*, and a *Mamillaria*. The round *Cacteæ*, called Visnagas by the natives, are extensively used to make a sweetmeat sold in the streets of the city by the name of Dulce de Visnagas. In the north of the town, about a mile distant, lies the Cerro de Mercado, an iron mountain, containing 88 per cent. of that metal. During the winter it is of little interest to the botanist, being overgrown with *Opuntias*, and the only rare plants found there are a creeping *Aristolochia*, and a little fern, not observed in other localities.

In the gardens, besides the native productions, nearly all European fruits and vegetables are grown. This, however, has only been done of late years, and principally by foreigners. In Durango Dr. L. Kegel, a German physician, has made himself very useful by introducing a great number. I obtained from that gentleman a series of notes respecting the horticulture of the place; but, however interesting, they are too long to be here inserted.* Of culinary vegetables, none excels the cauliflower, which grows to such a size that a single head measures one and a half to two feet in diameter, and makes a donkey-load. This gigantic cauliflower is not distinct from our European species, but solely produced by a cultivation which necessity has dictated. Being one of the northern vegetables that degenerate, or bear no seed, if not annually procured from Europe, it is propagated in a different way. After the heads have been gathered, the stubs are allowed to throw out new shoots. These are employed for cuttings, and have to grow two years, producing in the second the enormous heads. Among the exotic fruits the peach and vine succeed best. The principal indigenous fruits are the Tejocote (Texocote of Hernandez), a *Pomacea*, perhaps an *Amelanchier*, and the Zapote blanco (*Casimiroa edulis*, Ll. and Lexarza). *Casimiroa* is one of the numerous genera whose place in the Natural System is not definitely settled. By analyzing, I found it to belong to the order *Araliaceæ*, and to be closely related to the genus *Paratropia*, DC. The diagnosis of *Casimiroa*, as given by La Llave and Lexarza in Nov. Veget. Descrip. ii. 2, and in Endlicher's 'Genera Plantarum,' sub no. 6879, is deficient; but I do not see any mistakes in it except one, viz., the insertion of the stamens. The tree has a remarkable tendency to accommodate itself to different climates. It grows from the lowest coast-region up to an elevation of 7,000 feet, producing everywhere an abundant harvest of delicious fruit. It was well known to the Aztecs, who termed it Iztactzapote and also Cochitzapote; the former name is composed of the words *iztac* (white) and *tzapote* (sapote). Tzapote, from which comes the Spanish corruption zapote, and the English sapote, signifies a succulent fruit, containing large hard seeds, as, for instance, that of *Lucuma*, *Anona*, *Achras*, &c. —a word for which our present botanical terminology has no equivalent expression. The second name, Cochitzapote, is derived from *cochi* (to make sleepy) and *tzapote* (sapote), as the fruit, when eaten, produces a somniferous effect. Hernandez, in his 'Historia Plantarum,' lib. ii. cap. 142 (edition of Madrid, 1790) gives a fair account of the tree and its virtues, which, as that work is rather scarce, I will transcribe. He says—"Arbor magna est atque incondita, foliis Mali medicæ, raris ac ternis, stipitibus albis nævis distinctis, floribus pallentibus et modicis, fructu vero Cotonei forma et magnitudine, vocato a nosotris Hispanis, 'Zapote blanco,' eduli, saporis grati, sed non admodum salubris nutrimenti, et ossis nucleo læthali ac deleterio. Cortex arboris siccus est, ac paululum dulcis non sine quadam amaritudine: folia tusa et opposita nutricum papillis infantulorum medentur diarrhœis: ossa usta et in farinam redacta opitulantur ulceribus putridis vitiata carne prorsus exesa atque absumta, purgato ulcere, carne generata, ac cicatrice mira quadam celeritate inducta; poma ingesta somnum conciliant, a quo invenere nomen (Cochitzapote). Nascitur in calidis frigidisque regionibus."

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* Dr. L. Kegel has the best and largest garden in Durango, and even possesses a hothouse for the cultivation of Mexican *Orchideæ*, which is, I believe, the only building of that kind in the whole Republic.

My original plan was to visit Chihuahua. The principal reason which induced me to alter the route was the season. I had seen the destructive effect the winter produced upon the vegetation of the highlands, and was therefore obliged to abstain as much as possible from proceeding farther northward. Another reason was the great risk every one incurs who now ventures to Chihuahua. The tide of civilization pressing hard from north and east is driving all the Indians into the corner formed by the states of Chihuahua, Sonora, and Durango. The Mexicans, too weak to oppose, are fast retreating, and thus it is that during the last few years the above-named states have been depopulated and ruined. The savages spare none: everybody, who falls into their hands, dies a cruel death. So great is the terror they inspire, and so daring their courage, that eighty Indians have ventured into the streets of Durango—a place of 22,000 inhabitants—killing and robbing in every direction. There was a party of Irish and Germans going to Chihuahua who made a great effort to induce me to join them. The reason already mentioned determined me to refuse the offer, and well may I congratulate myself on that account. A few days after their departure, intelligence arrived that the whole party had been murdered, only one servant escaping. The deed had been accompanied by such frightful cruelties that a general consternation spread through the city. The Mexican government is well aware of the danger. They have formed several Guerilla parties;

composed of North Americans, who make attacks upon the Comanches, and are paid, for every head they bring, 200 dollars. But the Indians are so numerous that little effect has at present resulted from the measure.

I now took a south-western direction, the road to Tepic. Departing from Durango on the 2nd of January, 1850, I reached, on the 5th instant, San Francisco de Mesquital, a considerable village, whose inhabitants, as the latter part of the name indicates, occupy themselves by preparing mesquital from the Agaves. In proceeding I crossed the river Mesquital, the banks of which were shaded by huge trees of *Taxodium distichum.* This tree, called in Spanish Sabino, in Aztec, Ahoehoetl, always grows near running streams like the Cedro de la sierra (*Cupressus*, sp. no. 2000). Often have I rejoiced when, after having sought a long time for water, the tops of some Sabinos were descried: I had found the object of my search. Except this tree and the Cedro, I know of no *Conifera* that is confined so closely to the edge of the water. Near the same river I observed a new genus belonging to *Rosaceæ*, tribe *Spiræaceæ*, a shrub four feet high, with white odoriferous flowers, vernacularly termed Romerillo simarron, *i. e.*, Wild Rosemary.

As far as Mesquital there are several large estates, but, having passed that place, you enter a desolate district. There are no houses, no people. The road becomes mountainous, and very badly marked, as it is only trodden by a few Indians; the principal communication between Durango and Tepic being carried on *viâ* Guadalajara. I collected, however, a good many specimens, the vegetation not having suffered so much from frost as in that part of the Sierra Madre which I crossed when coming from Mazatlan. On the 12th of January I reached the village of Santa Teresa, two days distant from Tepic. This village is inhabited by the Coras, a tribe of Indians whom the religious zeal of the Jesuits converted to Christianity during the last century. There were only three persons in the place who could speak Spanish, all the rest talking a language of their own. They seem to be an honest people; and I rather offended them by sleeping in the tent and not coming to their houses. Several times they tried to make me understand that they were not like the Apaches, and had no communication with the Comanches.

Santa Teresa is surrounded by Oak and Pine forests, but stands high, and I had to descend into the ravines in order to obtain specimens for the herbarium. I remained five days, proceeded to within a day's distance of Tepic, and then returned to Durango, taking a different route, which conducted me to a place called Guajolote. The Indians of Guajolote and the Cora tribe in general boil and eat the flowers of *Yucca aloifolia* and several Agaves. What wonderful plants the Agaves are! There is not a particle of them that is not used in some way or another. In Ecuador I found the people using the spongy substance of the flower-stem of *A. Americana* instead of tinder, and in all the schools the green leaves instead of paper. A punishment among the Aztecs was introducing the spiny points of the leaves into the skin, as may be seen from their pictorial writings.

I left Durango on the 13th of February, in company with a Mexican gentleman and Mr. Henri Herz, the celebrated pianist and composer, who was on his way to California. The road was in a terrible state, the Comanche Indians having come near and already killed several of the rancheros. All the places were deserted, the people fled. We, thank God, arrived safe in Mazatlan on the 22nd of February, 1850, where Mr. Henri Herz and I were hospitably received by some of my friends—the house of Lomer, Melchers, and Co. H.M.S. Herald had not returned, and did not make her appearance before the 22nd of March. The vessel had been surveying, in the Gulf of California, the coast of Sinaloa and Sonora, which is described by the officers as a sterile and barren country.

Appendix to the 'SPICILÆGIA GORGONEA,' *published in the* 'FLORA OF THE NIGER EXPEDITION'; *by* P. B. WEBB, Esq.

(*Continued from p.* 348.)

CHRYSOBALANEÆ.

89 *c*. Parinarium *excelsum*, Sab. A handsome Rosaceous tree, found originally at Sierra Leone, and afterwards in Senegal.

COMBRETACEÆ.

89 *d*. Guiera *Senegalensis*, Lam. This plant, a native of both the eastern and western portions of the African continent, must be added to the flora of these islands.

89 *e*. Combretum *micranthum*, Don. An elegant shrub, which ex-

tends from the Cape de Verd islands and Senegal to Sierra Leone, where Don first found it.

MYRTACEÆ.

97 *a*. Psidium *pomiferum*, L. Though doubtless introduced, the Guava appears to be now indigenous in the Cape de Verd islands. According to Brunner, the plant has become perfectly wild on the hills of the island of Santiago. It has been furnished abundantly by M. Bocandé.

UMBELLIFERÆ.

98. Tornabenea *insularis*, Parl.; *Tetrapleura*, Parl. olim in Spic. Gorg. Mr. Bentham having already described a Leguminous plant of the groupe *Mimoseæ*, under the name of *Tetrapleura* (see Flora Nigrit. p. 330), I am happy in having the opportunity of dedicating this genus to a distinguished Sicilian botanist—Father F. Tornabene—of the order of Saint Benedict, Professor of Botany in the University of Catania, who has published several interesting works on various botanical subjects, and greatly aided in the elucidation of the flora of Sicily.—*Filippo Parlatore.*

LORANTHACEÆ.

99 *a*. Loranthus *Pentagonia*, DC. (Mém. 6. Tab. 8). A single specimen of this species occurs in our collection.

102 *a*. Canthium *anonæfolium*, Nob. This species, which appears to be undescribed, is, probably, a native of the neighbouring continent, but we have not seen it in any collection.*

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* C. inerme, foliis late ovatis, subcordatis, supra glabrescentibus, subtus ad nervos hirsutis, stipulis bracteisque connatis, bracteolis squamæformibus, calyce edentulo, corolla ventricosa, fauce paleacea, annulata, stylo longe exserto, stigmate ovato, basi sulcato. *Frutex* inermis. *Ramuli* subtetragoni, robusti, breviter pilosuli. *Petioli* hirtuli, 3 lin. longi. *Stipulæ* connatæ. *Folia* ampla, 3–4½ poll. longa, 2–3 poll. lata, ovato-oblonga, basi subcordata, apice rotundata, apiculata, supra glabrescentia, subtus ad nervos hirtella. *Bracteæ* in cyathum 2 lin. longum pedunculos cingentem connatæ, subhirtellæ. *Bracteolæ* sparsæ, squamæformes. *Pedunculi* axillares, ter vel quater dichotomi, laxiuscule cymosi, folio subdimidio breviores, floribundi. *Pedicelli* floribus sublongiores. *Calyx* vix tertiam lineæ partem longus, cupulæformis, edentulus, glabrescens. *Corolla* æstivatione valvata, ventricoso-campanulata, extus glabra, fauce intus paleis reversis fimbriata, laciniis lanceolatis, acutis, reversis, tubo paulo longioribus. *Stamina* ad apicem annuli paleacei inserta, corollæ laciniis alternantia: *antheræ* lineares, acutæ, basi breviter sagittatæ, vix exsertæ, mox deciduæ. *Ovarium* 2-loculare, ovulis solitariis, ventre appensis. *Stylus* longe exsertus. *Stigma* obovatum, versus basim attenuatum, longitrorsum sulcatum. *Fructus* ignotus.

102 *b.* Canthium *triacanthum*, Nob. This is likewise a species which appears not to have been described. We give a description of it below.*

Cremaspora *Bocandeana*, Nob. The genus *Cremaspora*, founded by Mr. Bentham on the *Coffea hirsuta* of G. Don, is remarkable for its undivided stigma, and, as its name imports, pendulous ovules, by which character it approaches *Tertrea* and *Stenostomum*, but the former differs from it in having tetramerous flowers and the stigma of the latter is bifid. Our plant departs in several particulars from the description of *C. Africana*, Benth.; we have not, therefore, ventured to unite them, but give below its diagnosis apart, and a detailed description.†

Pavetta *syringoides*, Nob. This plant appears to resemble *P. genipæfolia*, Schum. et Thonn., but the nature of its inflorescence seems quite distinct. This is the only species as yet noted as growing further northward in Africa than the island of Fernando Po. We give its diagnosis and description below.*

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* C. ramis validis, spinis ternatis armatis, ramulis pubescentibus, stipulis linearibus; foliis lanceolato-ovatis ovatisque, basi rotundatis, mollibus, venis puberulis; calycis laciniis latis, ovatis, reversis, corolla tubulosa, intus sub medio paleacea; stylo breviter exserto, stigmate glaberrimo. *Frutex*? vel arbuscula? *Rami* validi, nigrescentes, spinis ternis atris armati, ramuli subteretes, apice pilis rufis pubescentes. *Stipulæ* e basi lata connatæ, lineares, acutæ, petiolo breviores vel subæquales, deciduæ. *Petiolus* pubescens, 3 lin. longus. *Folia* ovata vel lanceolato-ovata, acuta, basi rotundata vel subattenuata, 2–3 poll. longa, 2 poll. lata, utrinque mollissima sed ad venas tantum leviter puberula, supra saturate viridia, subtus pallida, reticulato-venosa. *Cymæ* ad ramulorum nodos aphyllæ, divaricato-dichotomæ, pedunculis brevibus mox divergentibus ancipitibus, puberulis, flore in dichotomiis solitario, in superioribus sæpe extra-axillari, bracteis ovatis squamosis. *Calyx* brevis, pubescens, tubo globosulo, laciniis latis obtusis reversis, tubo longioribus. *Corolla* 2 lin. circiter longa, subpubescens, laciniis lanceolatis acutis reversis æstivatione valvatis, tubo lato cylindraceo basi vix ventricoso duplo longioribus, intus sub medio annulo paleaceo cincto paleis latis deflexis. *Stamina* 5, basi laciniarum inserta, brevissima, antheris ovatis, acutis, sacculis basi obtusis, vix exsertis. *Stylus* exsertus, lacinias corollæ longitudine vix excedens. *Stigma* galeriforme, apice obtusiusculum, obscure 2-lobum. *Ovaria* 2-locularia, loculis 1-ovulatis, ovulis alte suspensis, fere pendulis. *Fructus* (junior) globoso-didymus vel ovatus, calycis laciniis coronatis.

† C. foliis brevissime petiolatis, utrinque nitidis, venis subtus hirtulis, floribus sessilibus, petiolo duplo longioribus, corolla calyce hirto triplo longiore. *Frutex* ramis oppositis, ut in *Coffea* horizontaliter divaricatis, gracilibus, fuscis, pilisque fuscis hirtulis. *Petioli* hirti, vix lineam unicam Anglicam longi. *Folia* elliptico-lanceolata, 2½ ad 3½ lin longa, 2 ad 2½ lin. lata, basi attenuata, apice in acumen obtusulum producta, margine revoluta, utrinque nitida, nervis subtus hirtulis. *Flores* in axillis glomerati, sessiles, petiolis duplo triplove longiores, hirtelli. *Bracteæ* parvæ, lineares, hirtæ. *Calyx* campanulatus, hirtus, 5-dentatus, dentibus tubo subbrevioribus. *Corolla* calyce triplo longior, æstivatione imbricato-torta, infundibuliformis, extus hirtella, intus glabra, fauce pilosa, laciniis oblongo-lanceolatis, tubi cylindracei longitudine. *Stamina* ad faucem inserta, filamentis brevissimis; *antheræ* elongatæ, apiculatæ, corolla breviores. *Ovarium* 2-loculare, loculis 1-ovulatis, ovulis ab apice loculi pendulis. *Stylus* simplex, inclusus, hirsutus. *Stigma* indivisum, acutum.

105. Mitrocarpum *ampliatum*, Hochst.? I refer to this species an annual *Mitrocarpum* just coming into flower. The form of the leaves is very similar, but the whole plant is more hairy.

Sapotaceæ.

141 *a*. Sapota *Achras*, Mill. M. Bocandé has sent specimens of this species, which appears to have become wild. There are likewise specimens of *Sapota marginata*, Dcne., in an earlier state than those gathered by Dr. Hooker, which were described by M. Decaisne in the 'Spicilegia Gorgonea.' It is not impossible that this plant may be found to be the same as the supposed species of *Chrysophyllum* mentioned by Don, and noted as *C. Africanum* by M. A. de Candolle. In addition, therefore, to the accurate details of the flower given by M. Decaisne, to which little could be added, I give below a more lengthened description of the leaves and inflorescence from our present specimens.†

(*To be continued.*)

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* P. ramis junioribus paleaceo-pilosis, stipulis e basi lata 7-fidis, foliis lanceolatis, glabris, ad nervos hirtis, corymbulis globosis, ad apicem pedunculorum ternatis, in thyrsum terminalem digestis. *Frutex* ramis gracilibus, subancipitibus, junioribus paleaceo-pilosis. *Stipulæ* hirsutæ vel glabrescentes, basi latæ, subvaginantes, supra basim palmato-7-fidæ, laciniis apice setaceis, intermedia longiore. *Petioli* 3 lin. longi, hirti. *Folia* lanceolata, summa obovata, vix 3-pollicaria, pollicem 1 lata, basi et apice attenuata, acuta, utrinque glabra, supra ad nervum medium et infra ad nervos omnes hirta. *Corymbi* terminales, inferiores, ex axillis foliolum prodeuntes, pedunculis inferioribus pollicem 1 circiter longis, superioribus aphyllis, sensim brevioribus, thyrsum 3–4 pollices longum polyanthum efformantibus. *Flores* sessiles cum bracteis in corymbos densos globosulos, inferioribus ternatis, superioribus simplicibus, ad apicem pedunculorum digesti. *Calyx* campanulatus, lineam 1 longus, basi et apice hirsutus, ultra medium 5-fidus, laciniis lanceolato-ovatis obtusiusculis. *Corolla* 3 lin. longa, extus glabra, tubo angusto cylindraceo, sub fauce pilosulo laciniis lineam 1 longis reversis, laciniis ovatis apice obtusis denticulatis, margine ciliatis. *Stamina* 5, sub fauce corollæ inserta, *filamenta* brevissima; *antheræ* lineares, medio affixæ, exsertæ, intus albentes. *Stylus* longissime exsertus, apice sparsim pilosus. *Stigma* spathulæformis. *Ovarium* biloculare, loculis 1-ovulatis. *Ovula* medio appensa.

† *Rami* duri, crassi, validi, striati, verrucis (florum culcitis) nodosi, juniores tomentosi. *Folia* petiolata, petiolis 5 lin. longis, ovata, apice rotundata, basi subattenuata, margine revoluta, 2½–4½ poll. longa, 1½–2½ poll. lata, coriacea, penninervia, juniora utrinque ferrugineo-tomentosa, adulta superne glabra, subtus araneosa. *Flores* fasciculati, 1–5, e culcitis (bractearum squamiformium congerie) in axillis foliorum dilapsorum persistentibus prodeuntes. *Pedicelli* 3–4 lin. longi, graciles, nutantes, versus apicem crassiores, glabri. *Calyx* 5-phyllus, lineam 1 longus, crassus, glaber. foliolis late ovatis, margine subscariosis, imbricatis, 2 exterioribus majoribus interiora foventibus.

The Origin of the Existing Vegetable Creation. *By* PROFESSOR J. F. SCHOUW. *Transactions of the Meeting of the Scandinavian Naturalists at Copenhagen, in* 1847, Append. K. p. 119. (Translated from the Danish, by N. WALLICH, M.D., F.R.S., V.P.L.S.)

(*Continued from p.* 326.)

3. Another fundamental question is this: *Has the existing vegetation of the globe been created at once, or by degrees?*

It appears to me that much may be said in favour of the latter alternative. We know that the surface of the globe has only gradually, and by various upheavings, become fitted for the growth of plants; and that soil and climate must, of course, have differed according to the different regions of the earth; we are, therefore, warranted in assuming, that each species was originally produced in such locality or localities as offered the most favourable conditions for its growth. Besides, it is acknowledged that the existence of certain plants depends on the existence of others, and that, therefore, the latter must necessarily have pre-existed. Parasites, both of the higher and lower classes, could not live, unless their supporting plants had been previously created. The vegetation of shady localities,—for instance, of forests,—may be presumed not to have existed before trees were created; nor those plants which are peculiar to bogs, before the Mosses and Confervæ which compose them. The vegetation produced by manure could not have been formed while no manure existed. The vegetation on naked rocks commences with Lichens and Mosses,* which accumulate a little mould and moisture, on which seeds of other plants may afterwards vegetate; but it is only by slow degrees that large plants, shrubs, and trees, can arise. Hence it is quite unlikely that, at the first creation of the vegetable world, plants in general should have been called into existence, before the conditions of such existence were in operation. I must, accordingly, consider the gradual origin as in the highest degree probable.

4. *Are there among existing plants some which have been transferred from an anterior creation?* This question scarcely admits of a satisfactory solution, owing to the advancement of the science of Geology not being such, as to furnish precise limits between the present and the im-

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* Or else with succulent plants, deriving their nourishment from the atmospheric moisture.

mediately preceding epoch in the history of our earth. Although examples may be quoted of existing species being found in old strata, it follows, from what has been stated before, that such species need not have survived the great convulsion of nature to which the present state of things succeeded; for if we take for granted that the same species may have been created simultaneously at different places, it may equally have been created at different periods.

5. If we assume, as I think we are warranted in doing, that the present vegetation has sprung up at different times, our next inquiry will be, *Which, among the existing species, are of an older, and which of a more recent creation?* Since we are acquainted with the different geological formations, may we not, in like manner, arrive at a knowledge of the different vegetable formations? In order to attain this knowledge. it is desirable to advert to the external conditions, under which th different floras of the present formation, or its phyto-geographical king doms, have originated; and likewise to the structure and characte of those kingdoms. Let us first, by way of experiment, take the *flora of the Alps*; that is to say, that vegetation which occurs on the Alps above the tree-limit, and under the snow-line. This flora is eminently characteristic, as compared with that of the plains and mountains of the middle of Europe, for which, as my type, I propose taking the flora of Germany, in the sense of the German botanists, comprising the Litorale,* Istria, and Southern Tyrol,† and placing the foot of the Alps and lower hills in direct contrast with the higher Alps, or what is called the Alpine region.

Now, if we consider the external conditions of this flora, that is, the geological features, we know from E. de Beaumont's researches, that the principal chain of the Alps is more recent than the rest of the European mountain ranges, since it has been formed during the latest upheavings of importance, and even after the diluvial formation; and, further, that the range which that author calls the Western Alps is of quite recent origin, subsequent to all the tertiary formations. This younger formation affords grounds for the probability, that the vegetation is, in like manner, of a more recent date, at least, that part of the flora of the Alps, which exists nowhere else; *first*, because the youngest Alps, as is regularly the case with the more recent lava, must have been more tardily qualified for the growth of plants ; and, *secondly*, it is difficult to conceive that plants, found at present only at an elevation of 6,000 to 9,000 feet, should have been in existence at a time when there were no mountains of any such height, except, perhaps, at a distance whence migration was scarcely possible. Besides, how shall we otherwise account for the actual presence of many plants peculiar to high Alps, though entirely wanting in the Apennines and Pyrenees, which have been raised at an earlier period? It must be admitted, nevertheless, that we cannot derive any very decisive argument from the subsequent uplifting of the Alps, since we are in darkness regarding the period to which the present vegetable world extends, and likewise in how far it may have survived the vast convulsions caused by the uplifting of such vast chains of mountains.

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* I presume, the coast from Fiume to Dalmatia.—N.W.

† It is scarcely necessary for me to observe, that in any other inquiry this combination of the Mediterranean flora with those of Germany and central Europe could not by any means be entertained.

The decreasing warmth of the earth forms another ground for ascribing a young age to the flora of the Alps; for, if the earth has cooled gradually, those plants, which thrive only under the lowest degrees of temperature, must have been produced last, inasmuch as the climate favourable for their growth did not exist at an earlier period. The theory of Agassiz is, however, opposed to this view. According to him, there has been a period of our globe, preceding the present, in which not only Switzerland, but France and Germany, lay buried under a permanent covering of ice, like our polar regions. Against this theory may be fitly urged, among others, the frequent traces of trees, which occur in the north of Europe, in the most recent tertiary formations; and also the numerous indications of an arboreous vegetation in the oldest peat-formations, and the submarine forests, which point out that the diluvial period, or immediately after it, there existed an arboreous vegetation in northern Europe, which assuredly could not have been the case had the middle of Europe been covered with perpetual snow. And, lastly, the fossil elephants and rhinoceroses of Siberia are opposed to the said theory ; for although it was a mistake to suppose that their presence was an indication of a warm climate, yet it is certain, on the other hand, that those animals could not have subsisted where the soil was eternally covered with ice; and this must have been pre-eminently the case in the north of Europe and Siberia, had it existed in the middle of Europe.

It appears, then, that considerations even of climate plead in favour of the recent age of the vegetation of the Alps; although it is readily conceded that this theory cannot by any means be looked upon as completely proved.

Stronger arguments may, perhaps, be derived, in more than one respect, from the *peculiar character of the flora of the Alps.* It is admitted on all hands, as proved by vegetable fossils, that the lower plants have been produced before those of a higher order; and that consequently the history of the earth, both in its vegetable and animal creation, exhibits a progressive development, ascending from the simpler forms or organizations, to those of a more compound nature. In the oldest period (of coal) flowerless plants predominated (*plantæ vasculares cryptogamæ*); in the brown-coal period this was the case with *Coniferæ* and *Cycadeæ*, both of which belong to the apetalous dicotyledons. With these facts before us, we feel justified in expecting that, in a modified degree, traces of similar proportions will be discovered in the existing vegetable world, and that out of two given floras, that in which the highest forms predominate, must be the youngest. In order to test this proposition, I have compared the flora of the Alps with that of Germany, and the antediluvian flora, and have arrived at the following, numerical results: * —

	Antediluvian Vegetation.		Existing Veget.	
	Before the Chalk.	After the Chalk.	Germany.	Alps.
Flowerless plants (*plantæ vasculares cryptogamæ*)	·81	·02	·02	·02
Ternary plants (*Monocotyledoneæ*)	·06	·13	·21	·16
Quinary plants (*Dicotyledoneæ*).				
apetalous	·12	·45	·08	·04
petaliferous	·01	·40	·69	·78

The Alps have, therefore, 78 per cent. corolliferous Dicotyledons; Germany only 69 per cent. The former world, after the chalk formation, has 40 per cent.; before the same, only 1 per cent. On the other hand, apetalous dicotyledons constitute, in the flora of the Alps, no more than 4 per cent.; but in that of Germany 8 per cent. (7 per cent. if sea-shore plants are deducted); while in the former world they were (including *Cycadeæ*) before the chalk, 12 per cent., after the same 45 per cent. With respect to flowerless plants, the quotients are alike,

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* With regard to the flora of Germany and the Alps, I have availed myself of Koch's 'Handbuch'; for the Antediluvian flora, of the enumeration given by Bronn, in 'Naturgeschichte der drei Reiche,' 77 Lief. 1846.

Vol. II. Plate XI.

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Fitch lith.

Reeve & Nichols imp.

while their proportion to those of a former world is exceedingly different. We must not, however, exclusively depend on numerical proportions, but also take into account which are the groupes that predominate, and chiefly characterize the flora of the Alps, developing themselves there in the greatest variety of forms. We shall accordingly find that Ranunculaceous, Rosaceous, Saxifrageous, and Cruciferous plants constitute the largest and most marked forms, while at the same time they belong to the most developed families; and that the next in rank are *Primulaceæ* and *Gentianeæ*, which may also be considered as very prevalent groupes. But none of the apetalous pentamerous, or the trimerous families are of any note on the Alps, much less are they here of any peculiar form. The alpine plants belonging to these groupes are representatives of ordinary German forms.

Errata in Professor Schouw's Memoir, in No. 23 (November 1850) :—In page 322, line 10, *for* tides, *read* currents ; page 323, last line, Mona refers to the island of Moen, to the southward of Zealand; page 326, line 4 from bottom, *for* New Holland, *read* Holland.

(*To be continued.*)

Description and Figure of the CEDRON *of the Magdalena River* (SIMABA CEDRON, *Planch.*) ; by Sir W. J. HOOKER, D.C.L., F.R., A., and L.S.

TAB. XI.

Of late, many inquiries have been made by medical gentlemen respecting a seed, or rather the cotyledons of the seed, of a plant well known in New Grenada to the natives under the name of "*Cedron*," and long celebrated there for its powerful medicinal properties. By whom it was first brought into notice in Europe, I am not aware; but my earliest information respecting it was derived from Mr. Wm. Purdie, late botanical Collector for the Royal Gardens of Kew, and now Curator of the Botanic Garden of Trinidad. At Bogotà Mr. Purdie had made the acquaintance of Dr. Cespèdes, an intelligent physician of the country, who directed his attention to the plant in question, and who forwarded to me a drawing, with very fair analysis of the flowers and fruit, which had been some time in his possession, and is inscribed—"*The* Cedron, *by Mutis: it has probably some inaccuracies.*" In his future journeyings, Mr. Purdie did not fail to search for the plant in its native woods, and on his way to the province of Antioquia, near the Magdalena, he wrote word, July 1846 :—"I have had the good fortune to detect the celebrated *Cedron*, a small tree, with the habit of the Jamaica Mountain-

Pride (*Mela Azedarach*). The seeds are here much sought after, and sold at one real each cotyledon, being considered an invaluable specific for the bites of snakes, for intermittents and stomach-complaints generally. The bark and wood, also, abound in a high degree with the bitter principle. Seeds and dried specimens and fruit preserved in brine will be despatched to the Royal Gardens."

The dried specimens sent by Mr. Purdie were further accompanied by the following note :—" The *Cedron* has an erect stem not more than six inches in diameter, crowned by an umbellate mass of branches, with large handsome pinnated foliage. So highly are the seeds prized here for their powerful medicinal virtues, that they cannot be purchased for less than two reals, or one shilling, each. I have had the testimony of medical men in Bogotà in favour of their properties, and Dr. Cheyne has frequently tried them with success. Dr. Cespèdes, some years ago, was sent expressly on a mission from Bogotà to the locality of this plant, which is in woods immediately behind the village of San Pablo, on the banks of the Rio Grande de Magdalena." The *Cedron* is, however, probably more extensively distributed than Dr. Cespèdes and Mr. Purdie imagine, especially to the westward towards the Pacific, in New Grenada ; for another Collector for Kew Gardens, then, and still, on board H.M. Surveying Ship the 'Herald' (Capt. Kellett, Commander), transmitted specimens to Kew the following year, 1847, from the " Isla de Caybo."

I am informed that the thirty-first volume of the 'Comptes Rendus,'[*] recently published, contains some information respecting the *Cedron* from the pen of M. Jamord ; but as I have not access to this work at

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[*] Since the above was in type, Dr. Wallich has most kindly referred to that work, and sent me the following extract from pp. 141–2 :—

"MEDECINE.—*Graines employées dans l'Amérique tropicale comme remède contre les effets de la morsure des serpents.* (Note de M. JAMORD.)

" En quittant cette ville la semaine dernière, M. Herran, Chargé d'affaires de la République de Costa-Rica en France, m'a remis un certain nombre de graines provenant d'un arbre nommé dans les pays *Cédron*, et qui habite sur les plateaux de la Cordillère des Andes. La propriété qu'on attribue à cette graine, comme puissant antidote contre la morsure des serpents les plus dangereux, paraît de nature à appeler l'attention, et M. Herran souhaiterait qu'on la soumît aux expériences nécessaires pour s'assurer de son efficacité.

" Je crois devoir, en conséquence, adresser à l'Académie les graines que m'a remises M. Herran, ainsi que l'extrait suivant d'une lettre qu'il m'a écrite en partant :—

" Ce n'est qu'en 1828 que les Indiens sauvages apportèrent sur le marché de Carthagène quelques graines de *cédron*. Pour en démontrer la vertu infaillible, ils firent mordre des animaux, et se firent mordre eux-mêmes, par les serpents les plus

the present time, I must content myself with an extract from an article in the 'Athenæum' journal for September, 1850, where it is observed :—"An account is given in the continental papers of a great congress of medical men which it is proposed to hold in France, for the purpose of testing, by experiment, the virtue of a newly-discovered cure for madness, and for the bites of venomous serpents, by means of '*Cedrone*' seed. It sceems that two individuals, M. Auguste Guillemin and M. Hippolyte Fournier, Professor of Mathematics of the department of Arveyron, have offered themselves to be operated on,—which means, we suppose, that they offer to let themselves be bitten, for the purpose of the inquiry." "It has been thought advisable," says the 'Brussels Herald,' "to postpone until next month the experiment to be tried on M. Auguste Guillemin, in order to afford sufficient time for all the celebrated men of France and other parts of Europe to meet together at this sort of medical congress, in which one of the most difficult problems of occult medicine is to be solved. It is announced that all the different States of Europe will be represented at this meeting;—Russia, by a physician attached to the person of the Emperor; the German States, by seventeen doctors; and Sweden, Norway, and Denmark, will send delegates, although in those cold regions there are but few serpents, and cases of madness are rare. Some of the *Cedrone* seed will be sown in the Jardin des Plantes, where it is hoped it will succeed. Several of the faculty who have already made experiments on different animals, hope, by means of the *Cedrone* seed, to arrive at the cure of mental disorders and epilepsy."

Dr. Pereira, in the new edition of his inestimable 'Materia Medica,' now in course of publication, has not yet come to the natural family (*Simarubaceæ*) to which this plant belongs: I therefore applied to that gentleman, to ask if he was aware of any experiments having been

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dangereux, appelés *toboba, corail de la montagne*, &c.: la promptitude avec laquelle le poison fut neutralisé fut si merveilleuse, qu'on paya la graine jusqu'à un doublon (83 francs).

"Pendant mon long séjour dans l'Amérique centrale, j'ai eu moi-même occasion de recourir à la graine de cédron dans huit cas différents. Voici comme je l'employais :—Cinq à six grains de cette graine étaient râpés; cette poudre, délayée dans une cuillerée d'eau-de-vie, je la faisais avaler au malade, puis j'en soupoudrais un morceau de linge imbibé d'eau-de-vie, que j'appliquais sur la morsure; celà fait, je laissais le malade reposer; et rarement j'ai eu besoin de répéter la dose pour le guérir radicalement.

"J'ai encore employé ce médicament avec succès dans de cas de fièvres intermittentes qui avaient résisté à l'emploi du sulfate de quinine."

tried in England with *Cedron.* He writes in reply (Nov. 2, 1850): —"I am not acquainted with any observations made in England, or even in Europe, respecting the *Simaba Cedron.* The little which I know about it I will relate to you, and you can make what use you please of my statement.

"The specimens of the seeds and fruit which I possess were brought a few months ago from Panama, by a gentleman (not a medical man). They were given to him by W. Barrington, Esq., an English surgeon at Panama. The statement accompanying them was to the effect that the seeds were much used, and with great confidence by the native doctors of the Panama country, both locally and internally, as the grand antidote against snake-poison.

"To the taste these seeds are intensely bitter, and doubtless, like the bitter barks and woods of other Simarubaceous plants (*e. gr.*, *Quassia* and *Simaruba*), they possess the properties of bitter tonics, and might be useful in dyspepsia, and, perhaps, even ague. Notwithstanding the faith of the Panama doctors, I am afraid there is not a shadow of hope that these seeds will prove an antidote against snake-poison: all the reputed antidotes to snake-poisons having hitherto proved unworthy of trust when used under the eye of competent observers."

Experiments will probably tend to confirm the soundness of the above observations of Dr. Pereira, and tend to show that the French doctors, as well as those of Panama, have taken an exaggerated view of the merits of the *Cedron.* As an intensely bitter principle, it will probably rank with its near botanical allies, *Quassia* and *Simaruba*, and is worthy of a figure and description in a journal, one of the objects of which is to make known useful and little-known vegetable products.

M. Planchon has the merit of giving a name and botanical station to this plant. In his excellent 'Revue de la famille des Simaroubées,' published in the fifth volume of the 'London Journal of Botany,' p. 566, he has first described this plant, from Mr. Purdie's specimens in my herbarium. He does not seem to have been aware of the existence of the fruit in the Museum of the Royal Gardens. This we are able to subjoin to our figure, and at first sight it is very unlike that of any other species in appearance and in size (so far as can be judged from the only fruits of a *Simaba* figured or described,—that of *Simaba Guianensis,* Aubl., Guian. vol. i. p. 153, and Kunth, Nov. Gen. Am. vol. vi. p. 514), "Carpella 4–5." Here the carpel, or drupe, is as large as a swan's egg, and solitary, but evidently so by the abortion of the other three or four ovaries: this circumstance, too, is indicated by the obliquity of the scar near the summit, representing the position of the style. The seed of commerce consists simply of the separated cotyledons, not much unlike blanched almonds, but larger and plano-convex.

Simaba *Cedron*, Planch.; trunco erecto, ramis subumbellato-capitatis, foliis longissimis pinnatis glabris sub-20-jugis cum impari, foliolis subcoriaceis elliptico-lanceolatis acuminulatis basi obliquis, racemis elongatis compositis, ramis rufescenti-subvelutinis, drupis magnis ovalibus solitariis (TAB. NOSTR. XI.).

S. Cedron, *Planchon, in Hook. Lond. Journ. Bot.* vol. vi. p. 566.

HAB. New Grenada. Banks near San Pablo of the Magdalena, *W. Purdie.* Isla de Caybo, coast of the Pacific, *Thomas Seemann.*

DESCR. The height of the *tree* is not exactly stated, but it probably does not exceed twenty feet, with an erect, undivided *trunk*, not more than six inches in diameter, crowned with a dense and somewhat umbellate head of *branches*. *Leaves* glabrous, two feet and more long, pinnated with twenty or more alternate, rarely opposite, subcoriaceous, sessile *leaflets*, 4–6 inches long, acuminulate, oblique (or inæquilateral) at the base, penninerved; the *rachis* is terete, terminated by an odd leaflet. *Racemes* two feet and more in length, strict, branched, the main *rachis* and *branches* clothed with minute, ferruginous, velvety down, chiefly towards the apices; *branches* short, solitary, or clustered; *pedicels* bracteolated. *Calyx* minute, cup-shaped, obscurely 5-toothed, ferruginous-downy. *Corolla* of five, linear, obtuse or retuse, spreading *petals*, pale brown and downy externally. *Stamens* ten, short, arising from the back of as many staminiferous *scales*, which are erect, and approximate into a tube. *Anthers* oblong, introrse. *Ovaries* five, seated upon a columnar *gynophore*, downy. *Styles* five, united into one, above the base, and exceeding the stamens in length. *Ovules* one in each ovary. *Fruit* a very large, solitary (by abortion) *drupe*, of an oval form, oblique at the top, and having a scar below the summit, indicating the former site of the style. The soft portion of the fruit seems, in the preserved state, not to have been very soft and fleshy: it is lined with a horny *endocarp*. *Seed* large, solitary, suspended, its integument membranaceous, with a conspicuous *chalaza*. *Albumen* none. *Embryo* conform with the side. *Cotyledons* very large, fleshy, white when fresh.

TAB. XI. Fig. 1, upper portion of a branched raceme; fig. 2, base of a leaf, and of a raceme, *nat. size*; fig. 3, flower, not fully expanded;

fig. 4, scale, bearing a stamen; fig. 5, ovaries, with the gynophore; fig. 6, transverse section through the five ovaries, *magnified*; fig. 7, fruit, or drupe; fig. 8, fruit cut round transversely, so as to exhibit the solitary seed; fig. 9, transverse section of the seed; fig. 10, a cotyledon, in the state in which they are exported:—*nat. size.*

BOTANICAL INFORMATION.

Botanical Piracy.

It has not been unfrequent of late, even for English works to copy the plates of the 'Botanical Magazine,' and publish them in a cheap form, as they can well afford to do, and that, too, not on a small scale. This no doubt may be considered a compliment to the work so pilfered from, and indicative of a difficulty the copyists would have in procuring such rare and interesting subjects through other channels; but it is manifestly not to the pecuniary advantage of the publisher of the work in question. Our Belgian friends do more than this, in the case of the 'Rhododendrons of the Sikkim Himalaya,' as may be seen in an advertisement just issued by M. Louis van Houtte, "Horticulteur, Fournisseur du Roi des Belges et de diverses autres cours d'Europe," in his "Prix Courant" for the present season, 1850. We give the following extract:—

"FLORE DES SERRES ET DES JARDINS DE L'EUROPE.

"Jaloux de marcher constamment dans la voie du progrès, l'éditeur de la FLORE n'a reculé devant aucun sacrifice, pour rendre cet ouvrage digne d'un succès toujours croissant. C'est ainsi, par exemple, que la FLORE a donné en deux livraisons (5^e et 6^e, 1849) les Rhododendron de l'Himalaya, reproduction des cinq plus belles planches d'un ouvrage anglais comprenant dix dessins et se vendant au prix *de* 5 *livres sterlings.* D'autre part, dans la 9^{me} livr. (Oct. 1849), il donne dans tout son ensemble et en planche quadruple le magnifique *Amherstia nobilis*, dessin dont les frais d'exécution représentent la valeur de dix planches ordinaires.

"En position de puiser aux meilleures sources, et dans les ouvrages les plus rares, les sujets de ses Miscellanées, il peut promettre à ses abonnés, pour l'année 1850, une abondante moisson de faits nouveaux et pleins d'intérêt."

What we consider here particularly worthy of attention is not only the fact of five out of ten plates of the Sikkim Rhododendrons being thus copied and sold cheap, but the gross misstatement of the cost of the original work, in large folio, being £5 sterling! We are not willing to say that this is a wilful misstatement in so respectable a man as M. Louis van Houtte; but this we will assert, that he ought to have known better. His name stands in the published list of subscribers to the volume, and as such he might have known that 16*s.* is the cost (a price actually not sufficient to cover the bare expenses of the publication); or £1 1*s.* to non-subscribers. *Verbum sat.*

NOTICES OF BOOKS.

Botany of the UNITED STATES EXPLORING EXPEDITION.

Though tardily (considering that Capt. Wilkes' voyage was undertaken between the years 1838–42), we are happy to learn that the American Government has decided on publishing an account, in a manner worthy of that truly great nation, of the plants collected by the naturalists of the Expedition. This work is entrusted to the charge of Dr. Asa Gray, the distinguished Professor of Botany in Harvard University, U. S. A. That gentleman is now on a visit to Europe, for the purpose of inspecting the various Herbaria which may assist him in so important an undertaking; and we are sure that he will do justice to the publication. A notice of the extent of these collections has been already given in the 'London Journal of Botany,' and, if we understand correctly, the species collected on the North American continent will be incorporated with the Flora of that country of Messrs. Torrey and Gray.

SULLIVANT, WILLIAM S.: *Contributions to the* BRYOLOGY *and* HEPATICOLOGY *of* NORTH AMERICA. Part II. 4to. *From the Memoirs of the American Academy of Arts and Sciences.* Vol. IV. New Series.

We are glad to see a second part of Mr. Sullivant's labours in the field of Bryology and Hepaticology, the first of which we had occasion to mention in very high terms. And the second is no less important. It describes and figures with great clearness—1. *Leskea Fendleri*, n. sp.; 2. *Schistidium ambiguum*, n. sp.; 3. *Fissidens Ravenalii*, n. sp.; 4. *Bryum*

Lescurianum, n. sp.; 5. *Dicranum rhabdocarpum,* n. sp.; 6. *Hypnum Oreganum,* n. sp.; 7. *Hypnum Oakesii,* Sull.; 8. *Sphagnum Torreyanum,* n. sp.; 9. *Frullania plana,* n. sp.; 10. *Frullania Nasquensis,* n. sp.; 11. *Riccia lutescens,* Schwein.

SPRING, A.: *Monographie de la Famille des* LYCOPODIACÉES. 1 Vol. 4to, 357 pp. Bruxelles, 1842 et 1849. (*Extrait des tomes XV. et XXIV. des Mémoires de l'Académie Royale de Belgique.*)

Few men have been more indefatigable in the study of any tribe of plants than Dr. Spring has been in that of the *Lycopodiaceæ,* and the result, as shown in the present publication, is alike honourable to himself and useful to Botany at large. The able author establishes four genera:—

1. LYCOPODIUM.—Antheridiis unilocularibus. Oophoridiis nullis.
2. SELAGINELLA.—Antheridiis unilocularibus. Oophoridiis 3-4-coccis.
3. TMESIPTERIS.—Antheridiis bilocularibus. Oophoridiis nullis.
4. PSILOTUM.—Antheridiis trilocularibus. Oophoridiis nullis.

LYCOPODIUM embraces 107 species; SELAGINELLA, 209; TMESIPTERIS, 2; PSILOTUM, 4. An excellent "*Morphologie et Organographie des* LYCOPODIACÉES," concludes the volume of 358 pages.

CARICES AMERICÆ SEPTENTRIONALIS *exsiccatæ. Edidit* H. P. CARTWELL, M.D. Part I. *Penn. Yan. Nov. Ebor.*

The above is the title of a fasciculus of dried specimens of North American *Carices,* chiefly gathered in the state of New York, and well preserved and named by Dr. Cartwell. We shall be glad to find that so useful a work, on such a very difficult and extensive genus, is encouraged in this country as well as in the United States.

END OF VOL. II.

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